THE physical therapy REVIEW

Manual Muscle Testing, Development and Current Use — WILLIAMS

Muscle Action During Childbirth — FITZHUGH and NEWTON

The Value of Occupational and Physical Therapy in a Small Psychiatric Unit — RUNDELL, KLISKA, AUSTIN, and McGINNIS

Vertical Hoist Device for Wheel Chairs — KRANS

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Volume 36 - Number 12 **December 1956**

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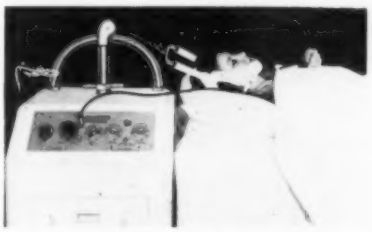

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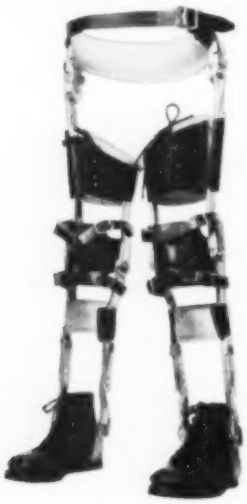

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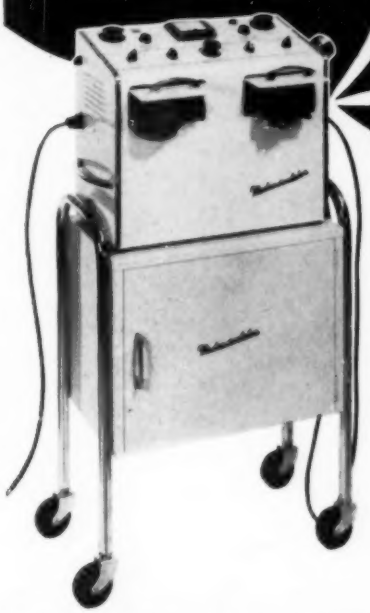

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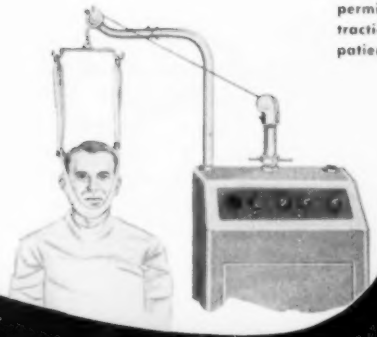

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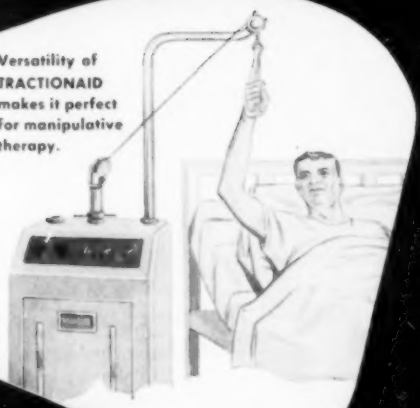

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Physical Therapy Offers You a Rewarding Career — An illustrated brochure with information for prospective students about physical therapy, the course of study, and opportunities for a career.

Physical Therapy Programs—1956—A list of schools approved by the Council on Medical Education and Hospitals of the American Medical Association.

Sources of Financial Assistance for Physical Therapy Student — 1956.

Poster: Join Ranks in a Proud Profession—Career poster for bulletin boards.

Career Facts—A brief on needs and opportunities.

Physical Therapy Record—A news tabloid with pictures depicting work of physical therapy for lay groups.

Open House Plans and Suggestions—A practical easy-to-use guide for a physical therapy department Open House for prospective students.

ORGANIZATION

Code of Ethics of the American Physical Therapy Association.

Personnel Policies for Physical Therapists.

Use of Nonprofessional Personnel — An illustrated pamphlet to assist the physical therapist to determine the need for nonprofessional personnel and to give guidance on inservice training and utilization.

Approved Schools and Courses of Physical Therapy 1928-1954.

Essentials of a Hospital Department — Physical Therapy (To members 25¢).

State Registration of Physical Therapists—Abstracts of state laws regarding registration of physical therapists.

Chapter Directory — List of chapter presidents and secretaries and district chairmen.

SCIENTIFIC REPRINTS

Home Care Instructions — Olmsted (15¢)

Active Games for Physically Handicapped Children — Gump and Yuen-Hung Mei (10¢)

Education for Childbirth: With Emphasis on the Role of the Physical Therapist — Flanagan, Heneage and Ashe (15¢)

Ultrasound Therapy—Miller and Weaver (15¢)

Physiology of the Heart and Circulation and Its Clinical Application in Physical Medicine — a bound edition of papers by nine authors with an introduction by Harry D. Bouman, M.D., Coordinator. (50¢)

Physical Therapy Program for the Upper Extremity Amputee — Jampol (10¢)

Physical Therapy in a Small Hospital — Stamm (15¢)

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Physical Therapy, A Career of Science and Service — A color filmstrip to interpret physical therapy to high school students and lay groups. Each chapter (and district) has a copy of this and additional copies may be purchased from the National Office at $4.50 per print.

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Slides

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Abstracts Reprinted

"Haltung," an Abstract from Body Posture by Magnus, and "Head Posture and Muscle Tone," Clinical Observations by A. Simons, abstracted by Signe Brunnstrom, have been reprinted in one pamphlet.

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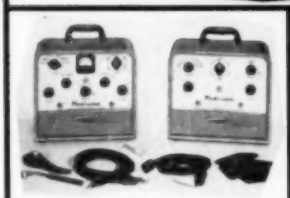

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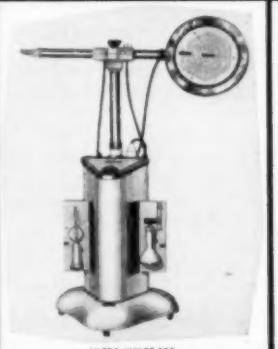

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Postgraduate Cerebral Palsy Course	Columbia University College of Physicians and Surgeons 630 West 168 Street New York, N. Y.	Office of the Dean Postgraduate Course in Cerebral Palsy College of Physicians and Surgeons 630 West 168 Street New York, N. Y.	March 4 to May 3, 1957
Technics of Neuromuscular Reeducation	California Rehabilitation Center Vallejo, California	Margaret Knott Chief Physical Therapist California Rehabilitation Center Vallejo, California	Entrance dates: October 1 January 1 April 1
Physical Therapy in the Care of Neuromuscular Disease	Georgia Warm Springs Foundation Warm Springs, Georgia	Robert L. Bennett, M.D. Medical Director Georgia Warm Springs Foundation Warm Springs, Georgia	Entrance dates: first Monday in January April October
Advanced Course in Physical Rehabilitation Methods	New York University-Bellevue Medical Center & New York University School of Education	Mrs. Edith Buchwald Lawton Director, Courses for Physical Therapists Institute of Physical Medicine and Rehabilitation 400 E. 34 Street, New York, N. Y.	Feb. 4 — Mar. 1, 1957 April 29 — May 24, 1957
Principles of Rehabilitation	University of Pennsylvania & Office of Vocational Rehabilitation	Rehabilitation Center Hospital of the University of Pennsylvania Philadelphia 4, Pennsylvania	Dec. 10–14, 1956 Feb. 4–8, 1957 April 22–26, 1957 June 17–21, 1957
Prosthetic Rehabilitation of Upper Extremity Amputee	College of Engineering & Postgraduate Medical School, New York University	Postgraduate Med. Sch. Prosthetic Education New York University 550 First Avenue New York, N. Y.	Feb. 18 — Mar. 1, 1957
Prosthetic Rehabilitation of Above-Knee Amputee	College of Engineering & Postgraduate Medical School New York University	Postgraduate Med. Sch. Prosthetic Education New York University 550 First Avenue New York, N. Y.	Dec. 6–14, 1956 *P.T.'s in*: Missouri, Iowa, Minnesota, Wisconsin March 28 — April 5, 1957 *P.T.'s in*: Kentucky, S. Ohio, Indiana, Illinois May 2–10, 1957 *P.T.'s in*: Michigan, N. Ohio, West Virginia June 6–14, 1957 — Open
Practical Management of Poliomyelitis and Principles of Rehabilitation	Baylor University College of Medicine, Southwestern Poliomyelitis Respiratory Center & Jefferson Davis Hospital in cooperation with The National Foundation for Infantile Paralysis	William A. Spencer, M.D. Medical Director Southwestern Poliomyelitis Respiratory Center Education Office 1300 Kenwood Lane Houston, Texas	Feb. 25 — Mar. 1, 1957

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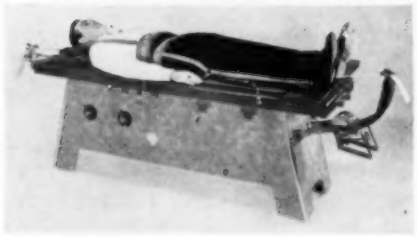

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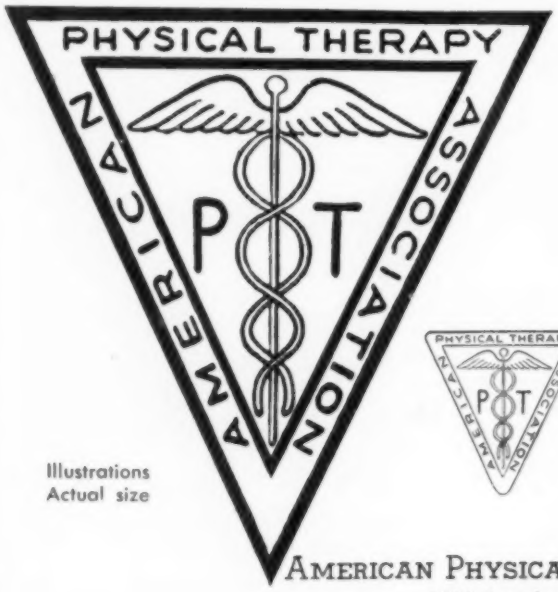

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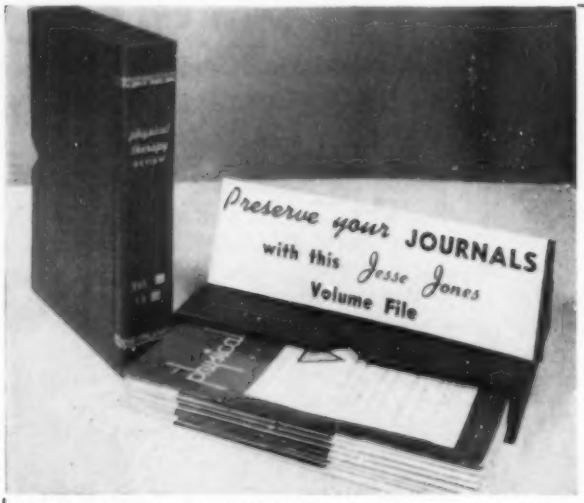

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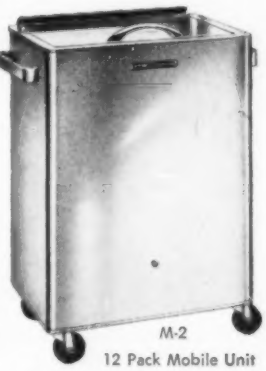

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Manual Muscle Testing, Development and Current Use

Marian Williams, Ph.D. (U.S.A.)

Manual muscle testing has been accepted over the years as one of the most important basic tools in the physical therapist's armamentarium. The most difficult task in reviewing this subject in the time available is to decide which areas to discuss and which must be passed over. The material which has been selected falls into three general sections:

first, a brief historical survey of the field, including adaptation of testing procedures for use in recent large-scale studies of poliomyelitis;

second, aspects of current use of manual muscle testing, based on a small sampling of medical facilities throughout the United States;

third, some considerations regarding technics and interpretation of manual grading procedures.

Historical Survey

The first muscle tests in this country were originated not quite 50 years ago in the office of an orthopedic surgeon in Boston, Dr. Robert W. Lovett. According to Dr. Lovett, the development of a practical system of muscle evaluation by manual means was an important part of the rapid progress in the treatment of infantile paralysis which had been prevalent in America since 1907.

The earliest descriptions of manual muscle tests were contained in an article written by Wilhelmine Wright, Dr. Lovett's senior assistant, and published in 1912 in the *Boston Medical and Surgical Journal*. Miss Wright had attended a school of gymnastics in Boston and later studied with Dr. Hoffa in Berlin. During her subsequent years with Dr. Lovett, she devoted nearly all her time to the development of muscle testing and reeducation procedures for use in the treatment of poliomyelitis. The muscle testing methods described in early publications utilized gravity and manual resistance and, on the basis of performance, grades of "normal, good, fair, poor, trace, and bad" were assigned. Fortunately, the term "bad" was soon replaced by "totally paralyzed." [28, 50]

In the summer of 1914, there was an epidemic of poliomyelitis in the state of Vermont, and Dr. Lovett was asked by the Vermont State Board of Health to undertake the treatment of patients involved in the epidemic. He set up treatment centers in five places in the state, and he and Miss Wright saw 235 cases at this time. Each patient was given a test for individual muscle involvement, in which only three grade categories were used: *totally paralyzed*, *partially paralyzed*, and *normal*. On this basis the condition of the

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muscles was recorded graphically on a diagram of the body which was originated by Dr. E. A. Sharpe of Buffalo, New York. Various muscles or muscle groups were outlined on the diagram, and shading was used to indicate the presence and degree of involvement.[26] This method of recording was later abandoned because it did not allow for sufficient variety and detail.

The following winter, Dr. Lovett sought the assistance of the department of physiology at Harvard University in working out a quantitative method of determining muscle strength. Requirements were that the technic must be simple and the results reliable. In cooperation with Dr. E. G. Martin of Harvard, tests were devised in which a spring-balance scale was attached to the body segments by a sling. The index of strength was arrived at through a "yield" test; that is, the part was placed in position and the examiner pulled on the sling until the part was forcibly moved. The tension indicated by the scale at the instant the resistance was overcome was recorded.[36] Although the spring-balance method of testing did not come into general clinical use, the "yield" or "break test" principle was later adopted as a form of applying resistance in manual muscle testing and is widely used today. (The examiner forcibly moves the part from a position which the subject attempts to maintain, rather than applying continuous resistance throughout the range of the test motion.) It could not be determined whether the adoption of this method of applying manual resistance was a direct outgrowth of the spring-balance technic which it resembles.

Although Dr. Lovett's early articles on the treatment of poliomyelitis emphasized the spring-balance tests, manual muscle tests were also given to all patients,[9] and Dr. Lovett's classic text on poliomyelitis, which appeared in 1916, included a description of both methods. In this book the section on muscle testing and muscle training was formulated by Miss Wright, and incorporated the material from her earlier article. Thus, while reference is commonly made to the Lovett tests and grades, much of the credit for their development, according to Dr. Lovett's own account, is actually due his assistant, Miss Wright. This section of the text suggested that a muscle evaluation should begin if possible with observation of the gait of the person, which permits an over-all estimate of his disability. Several weight bearing tests were described, such as balancing on the heels for the pretibial muscles, rising on the toes for the plantar flexors, and deep knee bending for the quadriceps. In tests involving manual resistance, pressure was to be applied through the range of the test motion.

Since this early period, many persons have contributed to the technics and concepts of manual muscle testing. Time will permit only a brief mention of some of the more significant contributions.

In 1932 the Lovett tests were republished with revisions and additions by two of Dr. Lovett's associates, Dr. Arthur Legg, an orthopedic surgeon on the staff of Harvard Medical School, and Janet Merrill, a physical therapist who became Director of Physical Therapeutics at Children's Hospital in Boston. The number of muscles to be tested was increased, and positions for grades of fair and poor were suggested throughout. This publication included a record sheet for the examination.[23]

Numerals for recording muscle test grades were suggested as early as 1922 by Dr. Charles Lowman, an orthopedic surgeon in Los Angeles. The scale he proposed ranged from nine, or normal, to zero; in describing the various tests in terms of the existing Lovett grades, Dr. Lowman referred to "plus" and "minus" gradations of the Lovett tests.[32] Plus and minus refinements in gradings are commonly used today, both with certain numerical scales and with the letter grades.

The recording of grades in percentage figures was introduced in 1936 by Henry O. and Florence P. Kendall, physical therapists of Baltimore. A normal muscle was given 100 per cent, good 75 per cent, fair 50 per cent, and so on. These therapists stressed the use of fatigue as an element in grading. Their work first appeared in a bulletin of the United States Public Health Service and has since been published as a text.[20]

In 1940, Signe Brunnstrom and Marjorie Dennen, physical therapists at the Institute for the Crippled and Disabled in New York City, reviewed the development and objectives of manual testing and pointed out examples of variations in technics which may lead to unreliable grading. These authors presented a syllabus on procedure accompanied by a record form in which letter grades were to be assigned to movements rather than to muscles. Space was also made available for numerical evaluation (0-5) of the individual muscles participating in certain of the movements.[5] However, emphasis in grading was placed on the ability to perform a specific movement, and it was argued that the rating of individual muscles concerned in the movement is highly subjective.[5]

Elizabeth Kenny suggested a method of "muscle

analysis" for use with poliomyelitis patients, in which spasm and incoordination were recorded and the muscles were graded as either functioning or nonfunctioning. In 1942, Alice Lou Plastridge Converse, then serving as director of physical therapy at Georgia Warm Springs Foundation, combined features of the "muscle analysis" with conventional manual muscle testing procedures in the acute and subacute stages.[43]

With increased public interest in poliomyelitis and the formation of the National Foundation for Infantile Paralysis in 1938, this organization began to play a part in various aspects of the field of poliomyelitis. In relation to manual muscle testing, it sponsored the development of a record form and, in 1946, a manual on muscle testing technics (Daniels, et al.). Muscle testing played an important role in the series of studies initiated by the National Foundation in 1951 to investigate agents for combating poliomyelitis and its effects. In the 1951-52 controlled studies involving gamma globulin, three physical therapists took part. The following year the survey of patients covered 37 states and required the services of 38 therapists. In the 1954 field trial of the Salk vaccine, 67 physical therapists were used. For large-scale projects such as these, certain features of manual muscle testing were of special concern, a subject which will be considered briefly later on.

An area of the field which has received attention is modification of procedures for use in the testing of small children. Elizabeth Zausmer has presented many helpful suggestions,[52] and a number of physical therapy schools and facilities have syllabus material on this subject. In 1953 a postconference instruction course on "Muscle Testing of Children" was sponsored by the American Physical Therapy Association. Stages of normal development were reviewed, and the use of toys, nursery rhymes, and other devices for motivation were discussed.

In summary, manual muscle testing in this country has continued along the lines of the original work of Wright and Lovett. Various symbols have been introduced for recording, tests have been added and test positions modified, and the necessity for recording the presence of spasm and contracture has been recognized. However, the basic principles of the gravity and resistance tests have remained unchanged.

ADAPTATION OF TESTING PROCEDURES FOR USE IN RECENT LARGE-SCALE POLIOMYELITIS STUDIES

In the evaluation and comparison of paralysis in patients over a wide geographical area, certain aspects of testing were of particular concern: (1) steps were taken to assure that the grades given by different physical therapists should be as uniform as possible; (2) as the studies dealt with early poliomyelitis cases, special consideration was given to mastication, swallowing, respiration, and involvement of facial, tongue, and palatal musculature; (3) strength tests were supplemented by detailed segmental measurements to indicate the presence of muscle atrophy; (4) an "index of involvement" was determined to facilitate comparison of the patients tested; this was a single numerical value assigned to each patient according to the total severity of his paralysis.

For the 1951-52 controlled study of the effect of gamma globulin in poliomyelitis, procedures were standardized and an abbreviated record form was developed by Dr. Jessie Wright and her associates at the D. T. Watson School of Physiatrics, Leetsdale, Pennsylvania. A total of 124 muscles or muscle groups were tested, which represented a somewhat abridged form of testing. One side of the record form included anatomical outline drawings of anterior and posterior views on which were recorded facial involvement, spasm, contractures and deformities, and various body measurements. In order to determine a final, numerical "index of involvement" for each patient, the Lovett letter grades were given number values; normal was designated as 0 (zero), and a completely paralyzed muscle or muscle group as 5. Next, each muscle or group of muscles was assigned an arbitrary factor of from 0.25 to 4, according to its bulk. This factor multiplied by the muscle grade was considered an indication of the extent of muscle involvement; for example, a muscle with a bulk factor of 2 and a grade of 4 (poor) would be scored as 8. If all muscles were completely paralyzed, a score of 560 would be recorded. The final "index" was based on the ratio of the score of involvement obtained to the possible score of 560 and expressed in a percentage figure ("per cent involvement").

In the more extensive survey of poliomyelitis patients in 1953, the same general plan of muscle evaluation was followed but with some changes in the grouping of the muscles tested and in the factor values assigned on the basis of muscle bulk. Here the total involvement score was 470. A major problem of this project was standardizing the grading procedures of 38 physical therapists. All those participating in the program attended one of four sessions for preliminary

instruction given by the same physical therapist, Miriam Jacobs, and covering a four- or five-day period. No attempt was made to use plus or minus refinements in grading. At the end of each training period a small experimental trial was carried out to determine the variability among examiners. On the basis of individual muscle grade comparisons it was found that physicians or physical therapists checking the same patients gave the same grades between two thirds and three fourths of the time. There was much closer agreement in the "per cent involvement" scores obtained by various examiners, as these differed by only 3 per cent.[25]

In the 1954 controlled studies of polio vaccine, special attention was given criteria for determining whether the patient should be considered as "paralytic" or "nonparalytic." It was recognized that minor muscle weaknesses which were reported might be due to asthenia of illness or, particularly in the case of neck and abdominal muscles, to pain and spasm. Five physicians reviewed data tabulated from the muscle examinations and drew their conclusions without reference to the laboratory findings or the vaccination status of the patients. Minimal criteria were adopted for reporting a case as paralytic, in which certain findings were excluded and others were accepted as significant. An interesting point here was that all ratings of "good" were eliminated from the scoring.[11]

Since 1954 various states have continued with muscle testing studies in relation to poliomyelitis, using the abridged grading system. This method was never intended, of course, to replace the usual detailed muscle examination which serves as a record of the patient's progress and a basis for his treatment. However, it has definite advantages in situations where detailed testing would not be practical or necessary.

Current Practices in Manual Muscle Testing

A short questionnaire was sent to physical therapists in various parts of the United States to investigate testing as it is now being done. The majority of facilities selected serve as training centers for students in physical therapy. Information was obtained from 51 persons in 22 states on questions which have been raised in the literature or in discussions of testing procedures. No attempt will be made to report these data in detail as such a small sampling cannot be considered to have statistical significance. Questions and answers were as follows:

1. *By whom is manual muscle testing done?* All staff physical therapists gave muscle tests in about four fifths of the facilities reporting. In 8 facilities, testing was limited to "certain" physical therapists, and in 2 instances testing was done "mainly by physicians" and by physicians "for the permanent record."
2. *For what types of cases is manual testing used?* Poliomyelitis was the most frequent answer here. Additional pathologies included posture cases, scoliosis, "low backs," surgical transplants, fractures, amputations, muscular dystrophies, peripheral nerve injuries, Erb's and Bell's palsy. Central nervous system disorders included paraplegias, quadriplegias, hemiplegias, multiple sclerosis, Guillain-Barré and Parkinson's syndromes. Some simply said testing was done "in all cases for which rehabilitation is indicated." Several persons pointed out the limitations of using conventional manual muscle testing for disabilities involving lesions of the central nervous system, particularly those resulting in spasticity.
3. *What symbols do you use in grading?* Letter grades (N, G, F, P, T, and zero) were used in 40 of the 51 facilities, percentage grades in 5, both letter grades and percentage grades or numerals were used in 4 facilities, and in 2 instances numerals (0-5) were preferred. It was frequently mentioned that plus and minus signs were added to the grades, and that a red pencil was used to record grades below F+, F, or F−.
4. *Do you use any routine variations when testing small children?* All replies were in the negative. One person pointed out that infants' tests are all variation and no routine. Two persons limited grades to "functional" and "nonfunctional" in the testing of very small children, and many mentioned the use of play and other means of motivation for this age group.
5. *In what tests do you use the body weight for resistance?* The test for the calf muscles was the one most commonly mentioned. Others were:
   - latissimus dorsi (sitting push-ups, or in one instance, chinning)
   - quadriceps (squat test or step climbing)
   - hip abductors (Trendelenberg test)
   - anterior tibial (walking on heels)

quadratus lumborum (standing, hiking hip)

One reply pointed out that more extensive use of body weight in testing is desirable but leads to problems of stabilization.

6. *Is there a policy regarding how often manual muscle tests are given?* The majority of facilities had no routine policy. Once a month was mentioned most frequently for the early polio patient, although there were many exceptions to this. A number of replies stated that muscle tests were given "as indicated." One person emphasized the hazard to the patient's morale if testing is done too often when there is little or no progress in muscle strength.

7. *Do you compute a single final grade representing the degree of total involvement?* This was done in 2 facilities. One was a respiratory center in which such a grade was desirable for research purposes; here the grade was based on the bulk of the muscles and their degree of involvement. The other facility arrived at a single final grade by averaging the grades of the "most important muscles." A number of facilities made a verbal functional summary of total involvement but did not attempt to translate this into a numerical value.

SOME CONSIDERATIONS REGARDING TECHNICS AND INTERPRETATION OF MANUAL GRADES

Let us consider first a basic difference in philosophy of manual muscle testing which has appeared in the literature from time to time through the years. This is whether emphasis should be placed on the grading of *movements* or of *muscles*. Authoritative arguments can be cited on either side. In support of the first view it has been said "(in grading) the relation of muscle group strength to joint action should be shown and recorded in terms of flexion and extension, abduction and adduction, and so forth . . . Grading muscle strength . . . should always represent as nearly as possible a clinically positive state."[35] Also, "The grading of movements can be made more objectively than the grading of individual muscles . . . Whenever necessary, the strength of individual muscles should be estimated, but it should be stressed that such grading is highly subjective. Movements and not individual muscles are represented in the cerebral cortex . . . When attempting to measure the strength of one muscle, we actually are measuring that muscle plus a number of other muscles or parts of muscles."[5] In support of the opposite view are the following statements: ". . . We should not be satisfied to do group testing . . . we should not feel that isolation of muscles in testing is impractical nor that grading individual muscles need be entirely subjective. Nature has a function for every muscle and the loss of even one muscle, especially in the muscles of the legs, means a definite loss of some function. . . . By examination and careful isolation of muscles we must find the weakness in individual muscles."[19] Also, "It is recognized that muscles perform in groups and that their actions are overlapping. Nevertheless, no two muscles have exactly the same action and no motion can be performed normally without all of its muscular components. With good knowledge of muscle function, careful positioning and observation, the strength of each muscle can be differentiated."[46] Thus, on the record sheets used in the various facilities muscles or joint movements may be emphasized or a combination of both may be listed.

Data on the reproducibility of testing made available in poliomyelitis studies in 1953 have some interesting implications. As was mentioned earlier, examiners trained in the abridged method tested the same patients and compared results. Using standardized procedures and omitting plus and minus grades, in tests for individual muscles two examiners agreed completely from 60 to 75 per cent of the time. It is noteworthy that most of the difficulty arose in differentiating between normal and good muscles. When these were grouped into one category, agreement rose to 90 per cent.[11] Beasley reported similar deviations in the upper level of grading. When manual grades given quadriceps in children were checked with dynamometer tests, it was found that in the ranges above 30 to 50 pounds the examiners were unable to distinguish differences of 20 to 25 per cent between right and left sides.[2]

The difficulty of grading accurately in the range of good to normal was also emphasized by Mulier and MacQueen who proposed a modified form of muscle testing for mild poliomyelitis. It was pointed out by these investigators that "errors in recognizing the signs of the disease are more easily made in the mild rather than in the severe forms." Their proposed testing routine included such vigorous activities as hopping on tiptoe on one leg, squatting and rising without assistance, and running.[41] Lovett and Martin claimed that their early spring-balance tests were especially useful in detecting weakness in what

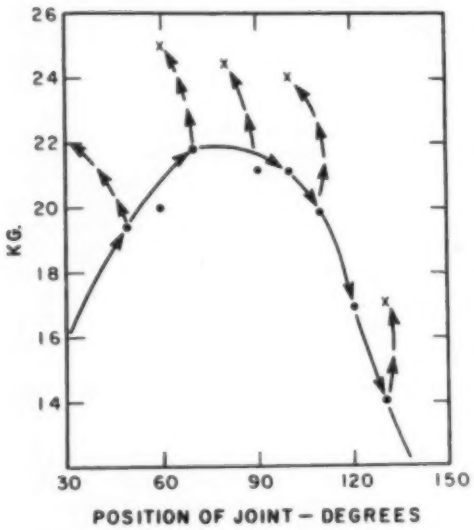

Figure 1. Isometric and "break" force in elbow flexion (after Bethe)

they termed "abortive" cases in which paralysis had not been reported.[29]

It has often been said that the test for the fair grade is probably the most objective of the test series. The ability to raise a part through an arc of motion against gravity is a fairly specific task. However, it cannot be said that a series of muscles or muscle groups with grades of fair have necessarily suffered an equal degree of involvment. Body segments vary in mass and proportion, and persons vary in build. The fair grade is also arbitrary in that considerable variation exists in the ratio of the weight of the body segments to the maximal muscle forces normally available to lift them. For example, dynamometer measurements made with the segment in a horizontal position show that the force moment exerted by gravity may compare with that of the maximal isometric contraction of the lifting muscles in a ratio as follows:

head in relation to neck flexors	1:3
lower limb in relation to hip abductors	1:6
leg in relation to knee extensors	1:10
forearm in relation to elbow flexors	1:16

(To determine these ratios, a sling was applied near the distal portion of the segment. With the subject relaxed, the part was first "weighed" in the sling; next, the direction of pull of the sling was reversed and the force of maximal isometric contraction of the lifting muscles was tested. The lever arms in these two measurements were kept equal by careful positioning of the sling; thus, the levers may be ignored and the ratio of the downward and upward test forces recorded indicates the ratio of the force moment exerted by gravity and that exerted by the lifting mucles.) If we may assume that the force moment required of a fair muscle in pulling the part upward is only slightly more than the force moment exerted by gravity (and possibly tension in the antagonists), then by "weighing" the part as described we can experimentally estimate the force moment required for a grade of fair. This provides a rough basis for a quantitative comparison of fair and normal muscle performance.

The figures cited should not be interpreted as exact nor as typical of any group of persons, as they were taken from isolated tests of a few adults. Also, they represent measurements made at only one position in the range of motion. However, such measurements as these show that: 1) the relation of the resistance of the segment and the maximum force which can be exerted by its prime movers varies in different segments and movements; on the basis of the figures cited, a grade of fair may represent a muscle force which in one instance is approximately one third of normal maximal force, while in others it is nearer one sixth, one tenth, or one sixteenth of normal; 2) as Beasley has shown, the level of fair (muscle force just able to lift the part) is *not* midway between zero and normal but is well below the midpoint; in other words, a vastly greater range exists between fair and normal than below fair. In this regard, it is interesting that Sharrard, on the basis of clinical observations of poliomyelitis patients in London, revised his grading scale to include an extra step between fair (3) and normal (6).[45]

The fact that the six grade points used in manual muscle testing are *not* equally distributed has been pointed out in the literature. The various steps have been described as representing a "non-linear, arbitrary scale of activity."[1] Lovett in his descriptions of manual tests emphasized that they were not mathematically accurate. Consequently, it is argued that the use of numerals in recording implies a graded, precise, and quantitative evaluation of strength which is not warranted by the nature of the tests. Regardless of the type of symbol used for recording, realistic interpretation of the grades requires that the concepts and methods of the tests must constantly be kept in mind.

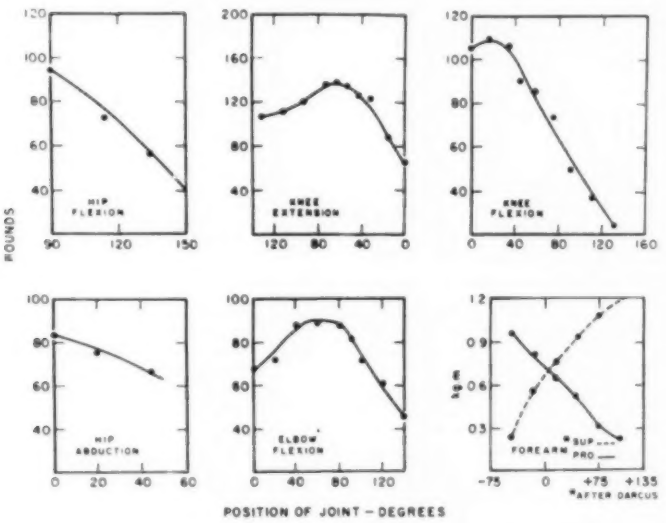

Figure 2. Maximum isometric torque curves for six joint movements

A consideration which has sometimes been overlooked, not only in muscle testing but in therapeutic exercise in general, is the variation in the force which a segment can normally exert at various points through its arc of motion.[25] Muscle tests are commonly performed by having the patient move the segment through the joint range and then hold it there against manual resistance. Examination of a number of maximum isometric joint torque curves, based on force measurements taken at intervals in the joint movement, shows that the test point is often near the weakest portion of the range (Fig. 1). Thus it would make a difference if one therapist were to grade the elbow or knee flexors, for example, with the joint at a right angle while another preferred a position of full flexion of the joint. This would not affect the reliability of the tests, as long as they were always done in the same manner, but it has implications for the functional interpretation of the grade. The force curve characteristic of the movement should also be considered if testing is done by applying manual resistance through the range of motion rather than at the end.

Another factor in the interpretation of test grades is the difference in the force value obtained from a "break" or yield test as compared with that from an isometric contraction. Lovett and Martin used the "break" method with the early spring-balance tests because it was easier to get children to hold a position against the pull of an outside force than to initiate a movement.[29] The method has probably been perpetuated in manual testing for the same reason—because it is easy to use. Dynamometer tests have shown that force values obtained in a "break" test are consistently higher than those that can be exerted in an isometric contraction against a fixed resistance (Fig. 2). This difference has been reported by Bethe to average between 20 and 30 per cent, but it can reach even 50 to 80 per cent.[4] Darwin reported the force of the finger flexors recorded from a "break" test exceeded that from an isometric contraction test by about 33 per cent.[10] Studies indicate that the amount by which break force exceeds isometric force may vary according to the point in the range of motion at which the tests are made, as well as with the condition of the person tested; there also may be variation among persons, among the muscle groups in the body, and variation according to the speed with which resistance is applied.[4, 47]

To summarize some of the functional considerations mentioned: first, although in ordinary activity muscles may contract concentrically, eccentrically, or statically, they are usually tested by the "break" method which is similar to eccentric contraction and favorable to a high force reading; second, a muscle group is able to exert least force on the segment near the end of its range of contraction, which is the point commonly

used for applying resistance in a "break" test. Thus from the point of view of a high force reading in resistance tests, the "break" method is favorable and the joint position usually used is unfavorable. A grade of fair is often interpreted to mean that a definite functional threshold has been reached. While elevation of the part against gravity is highly significant for the upper extremity, it may fall far short of the normal functional requirements for many of the lower extremity muscles. It is emphasized that none of these points detracts from the value of the tests themselves. They are mentioned here as useful observations in analysis of manual muscle tests and grades. They help to answer the question: What are we testing?

A further aspect of testing which cannot be considered in this brief review is a study and comparison of the various tests from the point of view of basic functional anatomy. This is a large and interesting subject in itself.

There are undoubtedly limitations in the procedure of manual muscle testing. It is significant, however, that the method has been universally accepted in the clinical evaluation of patients and is in general use today. It is particularly significant that in the recent poliomyelitis studies, when a means of assessing paralysis was of critical importance, it was agreed that this form of testing was the most practical method available.[12] It is of interest that after many years of analysis and use by highly trained persons, the principles and basic methods of manual muscle testing remain essentially similar to those developed nearly 50 years ago by Dr. Lovett and Miss Wright. This is a high tribute indeed to the wisdom and perception of these early pioneers.

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Muscle Action During Childbirth

Mabel L. Fitzhugh and Michael Newton, M.D.

The adaptation of certain physical therapy procedures for obstetrics has developed rapidly during the past decade. Particular interest in their use has been shown by the obstetrician who is concerned about the effect of excessive analgesia and anesthesia upon both mother and baby, and by the mother who desires consciously to cooperate during the birth of her baby.

Physical therapists are being called upon to train mothers during pregnancy, to support them during labor and delivery, and to give them postpartal muscle restoration exercises. To do this adequately requires a basic understanding of the kinesiology of childbirth. With such knowledge it is possible to apply successfully technics for assisting muscle action during childbirth.

The present discussion will be limited to procedures which can be used during the hospital stay. It should, however, be remembered that these technics are based on prenatal physical education for childbirth. They are of definite value when used solely while the patient is in labor, but greater success will be obtained if they form part of an integrated program lasting throughout a woman's obstetrical experience.

In the consideration of this subject parturition may be conveniently divided into four parts—early first stage of labor, transition stage of labor (these first two comprising what is commonly called the first stage of labor), second stage of labor, and third stage of labor and postnatal period.

The basic problem in labor is twofold: (1) how to increase the efficiency of the forces of expulsion, and (2) how to decrease the forces of resistance.

First Stage of Labor

Muscle action

The effective expulsive force of the first stage of labor is provided by the uterine muscle. The muscular fibers of the uterus extend like a hood over the fundus and down towards the cervix. Contraction of these fibers effectively squeezes the contents of the uterus towards the cervix and tends to pull that opening apart. Thus the cervix is gradually dilated and retracted over the presenting part of the fetus. In addition, there is a "rachet" principle by which some of the advantage gained by each contraction is retained.

Resistance against the expulsive action of the uterine muscle is provided by the circular fibromuscular tissue of the cervix. The degree of such resistance varies, since in some cases the cervix dilates easily and quickly and in others dilatation is slow and difficult. General relaxation may be conducive to relaxation of the cervix, whereas tension anywhere in the body may increase the resistance.

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There is reciprocal action between the longitudinal muscle of the uterus and the circular fibers of the cervix. This action is aided by the round ligaments. These structures are composed mainly of muscular tissue and are attached to the anterior wall of the uterus and inserted into the lowermost part of the abdominal wall. During a uterine contraction they serve to pull the uterus anteriorly, causing it to stand up, as it were; thus, its long axis is brought more nearly at right angles to the plane of the pelvic inlet.

The tonus of the abdominal wall may be one of the factors determining the ease with which the uterine mechanism can function. If the abdominal wall can expand easily during contractions, the uterus tips forward more efficiently. A taut abdominal wall prevents this tipping forward and may be responsible for some of the pain of the first stage of labor.

Technics for assisting muscle action in the first stage of labor

1. *Abdominal breathing.* Voluntary expansion of the abdominal wall during contractions increases the area surrounding the uterus and allows it to tip forward more easily. When contractions are short, one slow, smooth inhalation and exhalation may suffice. However, when contractions last more than a few seconds, most women are unable to breathe slowly enough to cover the contraction in one breath without tension, fatigue, and a sense of failure. Instead, several breaths should be taken, increasing the expansion of the abdominal wall with each inspiration. Some women find that they are able to hold the abdomen expanded and to breathe quite normally with the diaphragm at the same time. This requires practice, but when achieved can give great relief.

Instruction in abdominal breathing can be given first by having the woman place her hand on the instructor's lower abdomen to focus her attention on rhythmic expansion and relaxation of the muscles. Then the patient's hand can be transferred to her own abdomen, emphasizing the fact that expansion occurs during inhalation and relaxation during exhalation.

2. *Relaxation.* Complete relaxation of the entire body is a most valuable aid in reducing the discomfort of the first stage of labor. As a method of achieving this women may be taught relaxation in certain key areas—diaphragm, masseters, tongue, back of neck, hands, and feet.

In some women excitement and apprehension may produce "butterflies" or fluttering of the diaphragm. Relaxation may be obtained in the following way. The arms and legs are stretched, while the rib cage is arched and a deep inhalation taken. The "stretch" is then released with a sighing exhalation. The masseters are relaxed by allowing the lower jaw to sag. The back of the neck is relaxed by dropping the head forward. The hands are relaxed by leaving the fingers loosely flexed and the feet by preventing hyperextension of the toes. This type of instruction may be effective when given between contractions during labor even without previous training.

3. *Activity.* Many women are more comfortable in the early part of the first stage of labor if they engage in some type of light activity. Such occupations as light housework, walking, squatting, even scrubbing the kitchen floor on hands and knees may be of help. Relaxation during a contraction may be obtained by leaning against furniture or a wall.

4. *Position.* For some women relaxation is most easily achieved when lying down throughout the first stage of labor. Others will need to lie down only during the latter part of the first stage. Relaxation and abdominal breathing are easiest when all the joints are partially flexed. There are several different positions in which a woman may accomplish this. In fact, change of position during the first stage of labor may be very helpful, but it is important to be sure that whenever a change is made proper flexion of the joints and relaxation is obtained.

If the woman lies on her back, the bed should be broken at the knees as well as at the hips. Tall women usually prefer to have their backs propped higher than short, stocky women. The knees should be raised to a comfortable height with the thighs abducted and externally rotated. If the bed cannot be broken, pillows may serve the same purpose (Fig. 1). If the woman lies supine on a level bed her abdominal wall is taut and relaxation and abdominal expansion may be difficult.

When the patient lies on her side, the bed should be flat. A pillow should be placed under her head, but not under her shoulder. Another pillow between her legs gives added comfort and relaxation for her knees and feet (Fig. 2).

A sitting position in a comfortable chair may also be used on occasion. In this case a pillow should be placed behind the back to support the head. Sometimes a change to the hands-and-knees position with pelvic rocking or the knee-chest position with two pillows under the chest may be helpful.

The three-quarter prone position, used by

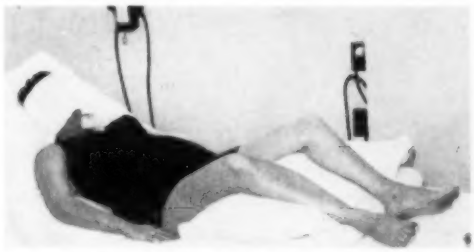

Figure 1. Position of relaxation on back during first stage of labor

Figure 2. Position of relaxation on side during first stage of labor (Note position of pillows)

many women for relaxation during pregnancy, is usually of no advantage during labor, since abdominal expansion is hampered by the pressure of the uterus against the bed.

TRANSITION STAGE

Muscle action

The transition stage may be defined as that period of labor which lasts between 6 cms. and full dilatation of the cervix. The action of the uterine muscle continues to be the sole expulsive force. However, it is worthwhile to consider this stage separately, because it is the time when most discomfort is felt, when the woman must not be left alone, and when proper support is essential.

Technics for assisting muscle action in transition stage

1. *Breathing.* Voluntary expansion of the abdomen may become difficult or impossible. In that case a woman may be encouraged to breathe with her lower ribs, expanding them laterally and exhaling completely with each breath. Attention may be focused on rib expansion by the instructor placing her hands on each side of the woman's lower chest. Demonstration between contractions may be helpful.

2. *Relaxation.* This becomes progressively more difficult during the transition stage. Constant encouragement is needed to see that as much relaxation as possible is maintained, since bearing down will not help the progress of labor at this time.

3. *Activity.* Most women prefer to lie down during this stage.

4. *Position.* It is essential for the woman to find a position of comfort. Since the transition stage usually lasts for only 10 to 12 contractions, one comfortable position will usually suffice. In some cases a woman may obtain greater comfort by being on her hands and knees and rocking her pelvis. Choice of position may be influenced by the fact that low backache is often prominent at this time. This may frequently be relieved by counter pressure of the attendant's hand against the sacrum. Either the patient's husband or her labor attendant may do this: plenty of talcum powder should be used so that the pressure and rubbing will not irritate the skin and cause discomfort.

SECOND STAGE OF LABOR

Muscle action

Recognition of the arrival of the second stage may be difficult, but it is frequently heralded by the observation that the patient has difficulty in breathing smoothly, and involuntarily catches her breath and holds it. During this stage the uterine muscle, of course, continues to push the baby down. In addition, however, use of the voluntary muscles of expulsion is important. Primarily these consist of the diaphragm and abdominal muscles. As these muscles contract, there is reciprocal relaxation of the muscles of the perineum and the pelvic outlet. The more efficient the contraction of the expulsive muscles, the greater is the degree of relaxation at the outlet and the greater the relief of pain.

Technics for assisting muscle action in the second stage

1. *Breathing.* The most effective expulsive efforts can be made if the patient takes a deep breath and holds it while she bears down. A second type of breathing is that of light upper chest panting which may be used to slow the passage of the head through the introitus at the end of the second stage. Thirdly, heavy panting with heaving chest and shoulders during contractions may be necessary to slow a precipitous delivery, and enable adequate preparations to be made. Such panting must begin at the start of a

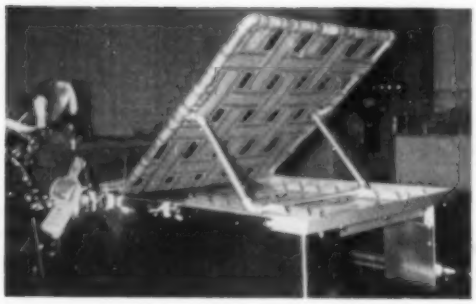

Figure 3. Adjustable back rest for use on a delivery table

contraction in order to be effective at its peak. The use of these three types of breathing in the second stage needs careful control and coaching. For example, the use of strong expulsive efforts at the beginning of the second stage in a primigravida may exhaust her too early. Constant observation of the progress of the second stage and an explanation to the patient of what to expect and what she should do will enable her to use these types of breathing to the best advantage.

2. *Position.* The presenting part of the baby should enter the pelvis at right angles to the plane of the inlet, and should be parallel to the long axis of the uterus. Thence, the baby follows a curved route through an arc of about 120 degrees. If the mother's spine can also be curved from her occiput to her coccyx, the force of the muscles of expulsion can be used more effectively.

The second stage of labor and delivery is commonly conducted in this country with the woman in the lithotomy position: she lies flat on the delivery table and her legs are raised high in the stirrups. The disadvantage of the level supine position during the second stage of labor is that great difficulty is experienced in contracting the abdominal muscles in this position. Some women when lying flat instinctively attempt to use their abdominal muscles by lifting their heads and shoulders and flexing their backs in the throes of an expulsive contraction. However, many other women extend their backs, arching them when pulling on the hand grips, an action which prevents the abdominal muscles from contracting effectively. They may make heroic efforts but their progress is slow and they experience considerable pain.

Greater efficiency and greater control of expulsive efforts can be obtained by placing a woman in a modified squatting position. This can be done by attaching an adjustable back rest to the standard delivery table. This allows a level area of about 18 inches where the patient's hips rest. The support for the back is formed of webbing which fits comfortably to the contour of the patient's back. A pillow is necessary to support the head for comfort between contractions. The back rest can be raised or lowered to suit the needs of a particular patient (Fig. 3). If no back rest is available the same effect may be obtained by placing three pillows under the pad of the table and one under the woman's head (Fig. 4).

In addition to improvement in the efficiency of the expulsive effort, relief of pain is often marked. In a series of 49 patients in whom the propped position was used, and in whom regional anesthesia was not employed, only 29 per cent requested gas. Seventy-one per cent delivered their babies without any inhalation anesthesia whatsoever, although it was available on request. Between contractions, also, the propped position has the advantage of relieving back strain and enabling the woman to rest comfortably.

THIRD STAGE OF LABOR AND POSTNATAL PERIOD

Muscle action

Delivery of the placenta is a repetition in miniature of the second stage. The contraction of the uterine muscle effects the separation of the placenta and takes a prominent part in pushing it down the birth canal. Its delivery, however, requires the additional force of the voluntary muscles of expulsion.

The postnatal period begins after the delivery of the placenta. The blood vessels of the uterus which have been supplying the placenta with oxygen and nourishment for the fetus are constricted by the continuing contractions of the longitudinal muscles and by the action of the figure-of-eight and spiral fibers of the middle layer of the uterine muscle. The effect of this is to prevent hemorrhage. Subsequently the uterus continues to contract and involute until it reaches its nonpregnant state in about 6 weeks. In addition, the abdominal and perineal muscles, stretched during pregnancy and delivery, gradually regain their normal size and tonus.

Technics for assisting muscle action in the third stage of labor and postnatal period

Assistance given during the third stage of labor is essentially a repetition of the methods used in the second stage. The woman remains in the same position on the delivery table. The expulsive effort

Figure 4. Position in second stage of labor using pillows

should be timed to coincide with a contraction of the uterus. Usually only one or two are necessary, but the woman may need some urging to bear down.

During the postnatal period the aim of the physical therapist should be to help the patient regain her normal muscular tone and activity as soon as possible. The sooner this is done the better. Specifically, the program may be started 6 to 12 hours after delivery, and continued regularly for 6 weeks. It consists of tensing the pelvic muscles, head lifting, trunk twisting and pelvic tilting. If these exercises have been practiced during pregnancy, the postpartum patient will find it relatively easy to resume them under supervision and, with regular practice, will quickly regain her muscle tone.

DISCUSSION

The technics described here have been found to be useful adjuncts in the relief of discomfort during labor and delivery in women. They can be used effectively even if the patient has had no previous instruction. However, the greatest benefit can be derived from them when they form a part of the whole management of the obstetric patient. The important parts of such a program are as follows:

1. Prenatal education in the physiology and events of childbirth.
2. Prenatal physical instruction for childbirth.
3. Adequate support during labor by an attendant who not only understands the technics, but also has a real and sympathetic desire to help women during childbirth.
4. Individualization of patient care, with particular reference to the provision of suitable medication during labor if and when the patient desires it.

The essential principle behind the whole of this program is that of cooperation. The physical therapist has much to offer from her knowledge of muscle action during parturition and of the technics by which muscle action may be assisted. By cooperating with the obstetrician and with the delivery suite personnel she can do much to make the average woman's labor and delivery more comfortable and more satisfying.

SUMMARY

An understanding of muscle action during parturition is a valuable aid to the physical therapist and others who prepare women for childbirth and support them during labor and delivery. Technics of breathing, relaxation, and position during childbirth, developed from this knowledge, can be used to make labor a more comfortable and satisfying experience for the average woman. They may be used most effectively when they form part of an obstetric program which emphasizes cooperation between all those concerned with the care of women during pregnancy, labor, delivery, and the postpartum period.

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The Value of Occupational and Physical Therapy in a Small Psychiatric Unit

Eve Rundell, Bernard Kliska, Elizabeth Austin, M.D., and James E. McGinnis, M.D.

What happens during the "other 23" hours of the day—the hours when the patient is not being treated by a doctor but is simply living in the special environment of the psychiatric hospital? In the Los Angeles County General Hospital Psychiatric Unit, the Physical Medicine Department has developed a total push program combining both physical and occupational therapy. The program is dynamic, purposeful, and takes into consideration the individual patient's over-all background, his relationship to his environment, and his emotional drives and conflicts. It recognizes that the psychiatric patient must not only understand his emotional problem, but in addition must attempt to adjust himself to reality and must be able to integrate himself into his hospital or community surroundings.

Although the Psychiatric Unit of the Los Angeles County General Hospital is primarily a receiving hospital for psychiatric patients in the County of Los Angeles, there is one ward where 30 patients are able to receive treatment for 90 days or less. The patients are carefully selected in regard to prognosis within this time limitation, so chronic drug addicts, chronic alcoholics, and chronic disorders are not treated here. Consequently, patients in the first episode of mental illness and in the acute stage of either neuroses or psychoses have priority for treatment. These patients have psychotherapy with resident psychiatrists under the close supervision of the psychiatric departments of the University of Southern California School of Medicine and the College of Medical Evangelists. The special procedures available for this ward are electro-convulsive therapy and electro-narcosis therapy.

Working in this total push program for these patients is a staff of one physical therapist, two occupational therapists, and one attendant.

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Occupational Therapy

Occupational therapy is available for these patients from 10:00 to 11:30 A.M. and from 2:30 to 4:00 P.M. each day. Before a patient may come to the occupational therapy shop a prescription form is filled out by his psychiatrist. This form carries such pertinent information as: initial diagnostic impression, present symptomatology, initial dynamic formulation, nature of interpersonal relationships, and precautions. Specific objectives such as relief of guilt feelings, outlets of hostility and aggression, building self-esteem, encouraging socially acceptable compulsive defenses are indicated, and general attitudes to be taken toward the patient such as active friendliness, passive friendliness, kind firmness, and indulgence, as well as matter of fact responses are also prescribed on this form.

A daily chart is kept of each patient noting appearance, sociability, reaction time, initiative, attention, stability, directability, persistence, cooperation, and interest.

A weekly conference is held with each psychotherapist to review his patients and to adjust the patient's activities to his changing needs.

The occupational therapist has the opportunity to evaluate these patients' emotional responses in the more nearly normal atmosphere of the shop. Conferences with the doctor describe the patient's relationships to the occupational therapist, to other patients singly or in a group, and also his performance in, or reaction to, the activity.

The patient cannot avoid putting something of his personality into his methods of working as well as into the article he creates. The woman who accidentally spoils the birthday gift she has made for her child and then blames this on another patient reveals through this incident something of her relationship with her child and her way of handling frustrations that she may not be able to express in words.

Another important contribution of occupational therapy in this psychiatric setting is that it may be used as an aid to psychotherapy, both through the activity itself, and through the interpersonal relationships. The prescription of specific work to meet emotional needs is very complicated, but its importance becomes clear when it is realized that the same act means different things to different people. For example, when creative painting or writing helps the patient to withdraw into a fantasy world, the activity works to his ultimate disadvantage. Another patient may use the same medium to externalize his problems with therapeutic emotional catharsis.

We do not feel that a specific prescription of activities is absolutely necessary. Exploratory use of various activities may be of great importance. The patient's spontaneous interests serve as a starting point; his reactions, favorable or destructive, provide clues for purposeful direction. All problems must be worked out by constant collaboration between the occupational therapist and the psychotherapist in terms of individual patient and treatment objectives. The strength of this occupational therapy program lies in its integration with the whole treatment program.

The general atmosphere of the occupational therapy clinic is permissive. While the patients are in the clinic the tool chest is kept unlocked so that any patient is free to use any tool he may need. This means that a suicidal patient may be using a knife, so the staff must be constantly alert. A complete tool check is made twice a day, each time the patients leave the clinic. No tool has ever been missing.

All patients who receive treatment in this hospital are allowed to wear their own clothing and are encouraged to use make-up and take pride in personal appearance.

A number of volunteer workers participate in the occupational therapy program. The adjustment of the patient to society when he is ready to leave the hospital environment is important. Contact with volunteers who represent the outside world is therefore of positive therapeutic value to the treatment of patients. In addition, the volunteer workers also distribute cosmetics and magazines to all the patients in the hospital and organize group activities on each of the remaining custodial wards under the supervision of members of the occupational therapy department.

PHYSICAL THERAPY

When treating psychiatric patients the physical therapist is constantly aware not only of the effect physical agents have upon somatic pathology, but of the importance of the treatment to the total person; hence, he is in an ideal position to give the patient psychological support as well.

In addition to meeting some of the needs of the patients, both physically and psychologically, the physical therapist may be able to observe behaviorism in a unique situation and convey pertinent information to the psychiatrist. It is implicitly understood that the physical therapist does not engage in directive or interpretive therapy.

Accepted physical therapy procedures may be used; however, in no other situation is adaptation to the individual problem more essential. One effective specific procedure is soothing heat; this is usually from a radiant source. The method of application of heat is of importance in treating anxiety, and the use of a blue filter is sedative and reduces the intensity of the heat. There must be a gradual increase in the intensity, and the stimulating effect of intense heat must be eliminated.

The full neutral wet sheet pack is another highly effective technic for the relief of tensions because the patient is protected from the stresses of the world. Verbal reassurance by the physical therapist is an essential part of treatment. Progressive relaxation and massage should be prescribed specifically by the patient's psychiatrist because of the emotional trauma possible from physical contact. Because the neuromuscular system is one of the primary somatic targets for anxiety reactions, sedative massage can help reduce tensions.

In treating patients with agressive tendencies and hostile feelings, the doctor and the therapist agree on a number of possible treatment procedures, the therapist then provides opportunities for the patient to reject one treatment and concedes to his demand for another as long as the technic lies within the indicated limits of the original prescription. The therapist has found punching bags, resistance weights, and the rowing machine—anything essentially fatiguing—helpful in working with these patients. In addition, the agressive tendencies of the patient may be met by the therapist's acceptance of verbal abuse, sarcasm, and uncooperativeness.

The insecure patient may be helped by the physical demonstration of his worthiness which is shown by the therapist's willingness to provide an atmosphere of security, affection, and social approval as well as the comfort the patient feels from being the object of special physical treatment. Technics are employed that complement

the psychotherapy the patient receives on the ward. The patient may relax here and enjoy an atmosphere different from the active ward and therapy situation.

The physical therapy must complement the psychotherapy, thus the physical therapist can augment the physician's statements to the patient with supporting assertions of his own. The patient's need for constant reassurance may be reinforced in the treatment situation. Rapport between the patient and the physical therapist is usually good because discipline is subtle, and the patient does not identify him with hostile authority.

RECREATION THERAPY

Recreation is part of a well adjusted life. Lack of recreation in any situation results in deterioration of emotional responses. Therefore, we try to make use of whatever portion of the patient's personality that remains accessible, and to provide pleasurable experiences and stimulation to help him in his progress toward mental health. It is a well accepted responsibility of the psychiatric hospital to provide recreation in some form, so that the patient may be exposed to as many normal experiences as possible. This program is an excellent method of combatting the patient's preoccupation with phantasy; it encourages his return to reality situations and purposeful living. Thus, it is a familiar bridge between the patient's preoccupation with himself and integration with the group.

For one and one-half hours daily, the occupational therapy and physical therapy programs are combined for recreational activities. The male physical therapist supervises the more destructive and aggressive patients and those who need masculine identification; the occupational therapists work with the anxious and insecure patients in small groups or individually or with those who need feminine identification. This program permits social contact with both male and female therapists.

Social activities are emphasized in this program and discharged patients who now return to the outpatient clinic are encouraged to participate under the supervision of the physical medicine department. It is encouraging for the hospitalized patient to see the former patient who is adjusting to the outside world. There seems to be a bond of understanding between them that gratifies a certain need of both the hospitalized and the outpatient. One such patient is now conducting a charm class for women patients consisting of group discussions of grooming, diet, exercise, care of hair, etc. Another outpatient is conducting a class in folk dancing.

The recreational program is flexible because it provides the opportunity to change the program as the needs for the subsequent groups of patients change. If several patients request to have a class in a certain activity from music appreciation to card games, this class is started whenever possible.

Sometime ago a sculpture class was given in the evening by a prominent sculptor under the general supervision of occupational therapy. The class provided an opportunity for the patients to express a need, a fantasy, or hostility under socially acceptable conditions.

Once a month, party dances are given in the evening. Patients are encouraged to assume as much responsibility as possible. The decorations and games are planned and carried out by the patients. Refreshments, whenever possible, are prepared by the patients themselves under the supervision of the occupational therapy department. It is felt that encouraging patients to assume responsibility while within a protected environment helps to bridge the gap between the completely controlled hospital situation and the outside world.

The occupational therapy department has a small number of books available for patients' use on the ward. A patient acts as librarian, checking out books and seeing that they are returned.

Once a week travelogues and educational type films are shown. The patients themselves select the films and any patient who has the aptitude and interest is taught to run the movie projector. Once a month a feature film is shown. There is no censoring of either books or movies. Because the patients are in this hospital for a comparatively short time, it is felt that it is advisable to keep them in a reality situation as much as possible. No one would censor their books or movies in society. If a patient becomes disturbed by a film or book, this reaction and its cause is very important to the psychotherapist and is reported to him immediately in order that he may subsequently work it out with the patient.

A class has just been started in learning the basic principles of contract bridge. One hour each day is devoted to this class, and the patients practice in the evenings.

COORDINATION

Similar objectives and similar attitudes are listed for both occupational and physical therapy

on the individual prescription forms to insure consistency in treatment program. The physical therapy department and the occupational therapy department are adjacent. All patients report to the occupational therapy department where the total program may encompass 6 hours daily. Part of this may be spent in the physical therapy section or in recreation. The physical therapist takes the individual patients from the occupational therapy section.

To provide a complete picture of the patient's needs and progress, both departments are represented at grand rounds and case presentations attended by the consulting staff, psychiatrists, psychologists, social service workers, and nurses.

CONCLUSION

Activities of physical therapy and occupational therapy provide the patient with an opportunity for emotional expression. Whenever possible activities are designed to encourage the social integration of the patient and his return to community living.

Suggestions from the Field

Vertical Hoist Device for Wheel Chairs

Wilma Krans, B.S.

Many disabled people, especially those who have weaknesses in the muscles of both the upper and lower extremities due to such diseases as poliomyelitis, muscular dystrophy, arthritis, and spinal cord injuries must spend a great deal of their time in wheel chairs. Often, it is impractical for them to climb stairs and therefore they must remain on one floor most of the time. Some of these people live in two story homes; thus, their families are confronted with the problem of converting one of the downstairs rooms into a bedroom for the disabled member of the family, or he must be transported by some means, either manually or by a mechanical device, to the upper floor. A system has been found to help meet this problem.

The device consists of a ¼ ton Budget Hoist which is secured to a hanger across the attic beams (Fig. 1). A small area is cut out of the floor of the attic for the cable from the hoist, and another area large enough for the wheel chair, is cut in the ceiling between the first and second floors. It is advisable for the opening to be in the disabled person's room. Here there is a double trap door with ropes attached to each side. To the hook from the hoist, there are ropes which

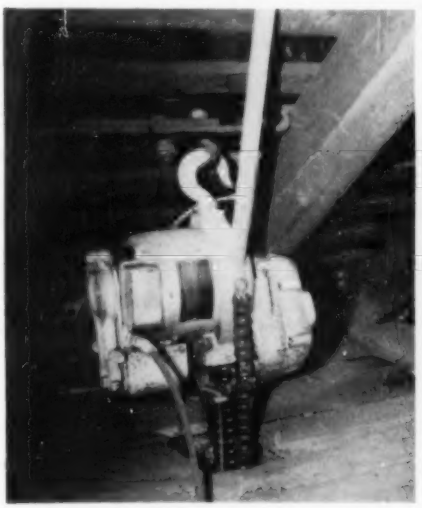

Figure 1

Senior Staff Physical Therapist, Institute of Physical Medicine and Rehabilitation New York University-Bellevue Medical Center, New York.

Figure 2

go on the wheel chair. One large loop is slipped around the handles of the chair and the other two lines snap on the cross bar of the foot rest (Fig. 2). The cord of the automatic hoist is then pulled, and the chair is lifted above the trap door (Fig. 3). The trap door is opened by pulling on the ropes attached to it, and the person then lowers himself to the first floor (Fig. 4). It is a simple and effective device which can be adapted to almost any type of home.

The cost of the hoist is about $150. There is, however, the expense of the carpenter work unless some member of the family can install it.

The device is especially effective because the patient can operate it himself, if his hands and arms are strong enough to fasten the clamps of the ropes on the wheel chair, and if he can grasp the automatic cable. This brings him one step closer to being independent.

The system was designed by Mr. George M. Nelson, of Westfield, New Jersey, for his daughter who, as a result of poliomyelitis, spends most of her time in a wheel chair. With the use of this device, she is completely independent.

Figure 3

Figure 4

Suggestions from the Field

Accessory Peg Board

Michael R. Sofranko, B.S.

The accessory peg board (Fig. 1) provides a spot check inventory of accessories, saves storage space and, most important, saves time in locating the necessary pieces of equipment and weights needed for treatment.

Hooks of various sizes and shapes are hung on the peg board to suit the type of equipment to be kept in easy access. These hooks can be purchased wherever the board is sold.

The construction and design is simplified by using a standard 4 foot by 8 foot peg board which is available at any lumber yard. The board can be cut easily to any desired size depending on the number of accessories one wishes to hang.

Before securing the peg board to a wall, it should be framed with ¼ inch wooden strips 1½ inches wide. This is to provide a back space into which the hooks are to be placed. A similar strip attached lengthwise to the center of the board will add more stability after the board is secured to the wall. Good firm anchorage, especially from the top, is advisable since most of the weight will be suspended from this point. Construction of the wall will determine the best method of securing the peg board.

The triangular weight rack supports were made from ⅛ inch by 1 inch steel angle iron pieces welded together (Fig. 2). The center weight bar is steel, ¼ by 1½ inches, and is 42 inches long. The 1½ inch width is used to keep the weights from turning and falling off the bar.

An adjustable center post helps to hold up the rack and transfers the weight to the floor. Adjustable length can be obtained by cutting a groove in the top of this post and securing it to the weight bar with a butterfly screw. The rack is hung from the peg board by hooks that fit into the holes of the triangular back plate supports.

CONCLUSION

A useful, practical, and time saving peg board for physical therapy departments equipped with an Elgin table, or other exercise tables, has been presented. Equipment and accessories are easily stored, neatly arranged, and are within easy reach for ready use during a treatment period. The peg board eliminates the confusion and searching for equipment which results when equipment is stored at random on shelves or in boxes.

The author wishes to acknowledge the assistance of Nancy Webster, occupational therapist, in the preparation of illustrations for this article.

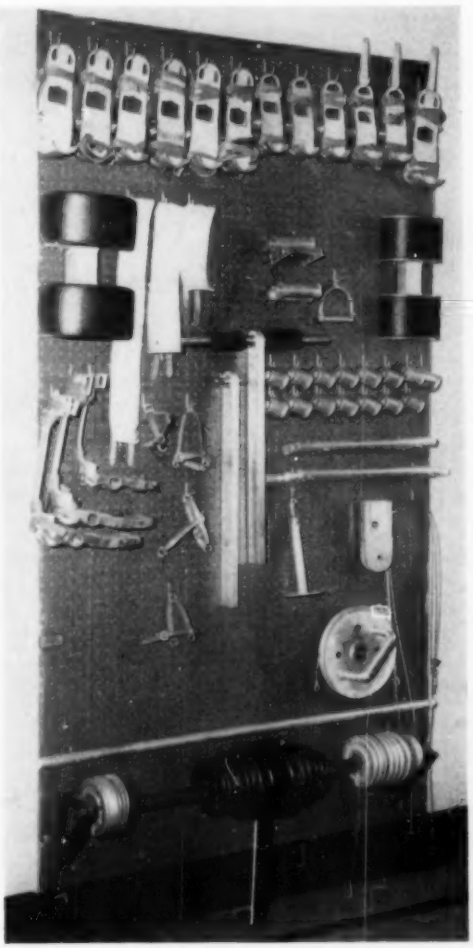

Figure 1. Peg board with accessories

NOTE: Scale drawing of weight rack support appears on following page ⟶

Chief, Physical Therapy Department, Middlesex Rehabilitation and Polio Hospital, New Brunswick, New Jersey.

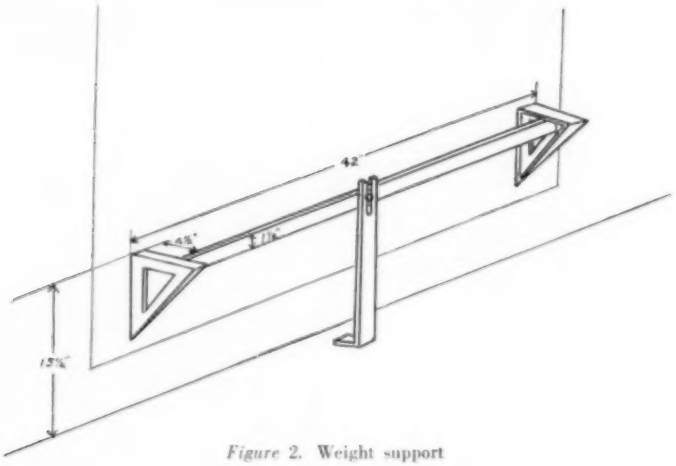

Figure 2. Weight support

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Editorial

Merry Christmas

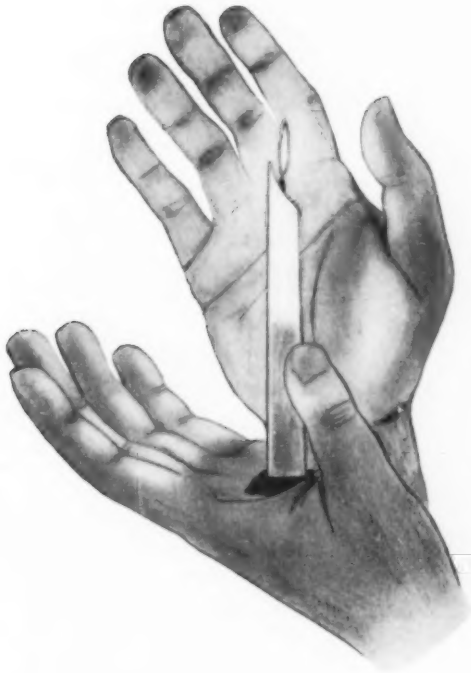
THE AGELESS Spirit of Christmas is perpetuated through the symbols of candles in the window, decorated trees, yule logs, carols learned as children, and Christmas stories of yester-year. One of the familiar and best loved stories is the beautiful, "Why the Chimes Rang," by Raymond MacDonald Alden.

In our busy pre-holiday season, it would be well to pause and read the endearing story of Pedro and his little brother. How they planned and dreamed of visiting the magnificent church, high on the hill in the great city where everyone came to worship on Christmas eve. At this time, people from miles around brought their gifts to the Christ Child. The legend tells that when the most worthy offering was laid on the altar the chimes, afar off in the high tower, would ring out. These were Christmas chimes and unusual in that they were not played by mortals. Some people thought the wind caused them to ring, others were sure the angels could start them swinging. Strangely enough, no living person had ever heard them; in fact, some of the people doubted they were there, since the tower was so high none could see them.

You will recall, on that bitterly cold Christmas eve as Pedro and his little brother were entering the walled city they found an old lady lying in the snow. How Pedro, knowing the poor woman would not live unless someone roused and fed her, insisted his brother go alone to the cathedral. With a heavy heart and tears in his eyes, Pedro gave his brother the small silver coin he had saved to lay on the altar, when no one was looking, and sent him on his way.

As you know, the exquisite chimes sounded that night for the first time in the lives of the people. They sounded not when the magnificent gifts were laid on the altar, nor when the king gave his jeweled crown; but they played clear sweet music when little brother dropped the dirty coin from his cold little fist, while Pedro tended the nearly frozen, exhausted woman outside the walls of the city.

The beauty of this legend reiterates, as do so many other Christmas stories, that the service of one man for his brother given with the simple faith of a child, far outweighs the glitter and gilt of any material gifts. May this Spirit of Christmas be with you now and each day of the coming year.



YE SHALL NOT APPEAR BEFORE THE LORD
EMPTY: EVERY MAN SHALL GIVE AS HE
IS ABLE, ACCORDING TO THE BLESSING
OF THE LORD THY GOD
WHICH HE HATH GIVEN THEE.

DEUT. 16: 16-17

With Every Blessing for the Holiday

Association Activities

Marriages

Joanne Baldwin, of Fresno, Calif., now Mrs. Joanne B. Peters, Cincinnati, Ohio.
Marion V. Billings, of Upper Montclair, N. J., to Richard P. Healy, Bloomfield, N. J.
Grace G. Blackmore, of Raleigh, N. C., to Brian M. Deely, Jr., Raleigh.
Lynne Blaugrund, of Trenton, N. J., to Alvin Felman, Cincinnati, Ohio.
Helen Carlson, of Minneapolis, Minn., now Mrs. Helen C. Schmidt, Minneapolis.
Marilyn Champion, of Independence, Mo., now Mrs. Marilyn C. Booker, Independence.
E. Irene Deschner, of Kansas City, Mo., to Robert Burcham, Kansas City.
Patricia Elmer, of San Francisco, Calif., to Ray Turner Moore, Jr., Palo Alto, Calif.
Eleanor Evenson, of Madison, Wis., to David H. Minshall, Madison.
Barbara Farmer, of New Orleans, La., to Norwood N. Hingle, Jr., New Orleans.
Nadine George, of Snohomish, Wash., to Charles M. Reed, Marysville, Wash.
Susanne Howe, of Worcester, Mass., now Mrs. Susanne H. Sheleg, Worcester.
Ella F. Johnson, of Santa Barbara, Calif., now Mrs. Ella J. Coil, Santa Barbara.
Barbara Koppen, of Iowa City, Iowa, to Richard R. Barnes, Fort Dodge, Iowa.
Mary Motelet, of Rockford, Ill., now Mrs. Mary M. Comfort, Madison, Wis.
Rita Nessinger, of Chicago, Ill., to F. W. Siemer, Jr., Chicago.
Phyllis R. Rubin, of San Francisco, Calif., to Harold M. Tannin, Hayward, Calif.
Rosalie M. Smith, of San Francisco, Calif., to Charles E. Basye, Palo Alto, Calif.
Julia Stapley, of Rochester, Minn., to Ronald Zimmerman, Portsmouth, Va.
Mary Telford, of Greenwood, S. C., now Mrs. Mary T. Garner, Winter Haven, Fla.
Ann Voth, of Akron, Ohio, to J. M. McGee, Akron.
Patricia Whitmore, of Denver, Colo., to R. W. Allsup, Greeley, Colo.
Mildred E. Wordell, of West Roxbury, Mass., now Mrs. Mildred W. Lamb, West Roxbury.

Publications by Members

Ita McDermott, Visiting Nurses Association, Brooklyn, New York, is co-author with Enrica Nicholson of "Nursing Care in the Home," which is Part 3 of "Congenital Dysplasia and Dislocation of the Hips," published in the October, 1956, issue of the *American Journal of Nursing*.

The same issue of the *Journal* carries a partial reprint of "Attitudinal Contractures" by Henry Stano, Association member, and Jack Meislin, M.D., published in the *Physical Therapy Review*, February, 1956.

The October, 1956, issue of *Braces Today* includes a brief review of "Some Variations in Therapeutic Exercise Terminology" by Major Dorothea Lawrence, (MSpC, U.S. Air Force), originally published in the August, 1956, issue of the *Physical Therapy Review*.

Chapter News

Eastern Missouri

Eastern Missouri Chapter includes in their 1956 Yearbook a directory of members and the revised chapter bylaws.

Iowa

On October 4, 1956 the Iowa Chapter held a reception honoring the new students at the University of Iowa.

Louisiana

The July issue of the Louisiana Newsletter carried a report of the 1956 House of Delegates meeting and announced further reports of the Second Congress of the World Confederation for Physical Therapy to be given at the September meeting.

New Hampshire

The New Hampshire Chapter has published a combination program-directory. It presents the names of officers, advisory council, chairmen of committees, announces the program for the year, and includes the names of active, inactive, and life members.

Northern California

The Northern California Chapter devoted two scientific program meetings in October and November to the subject of ultrasound. At the first meeting the literature was reviewed, physics and the physiological effects of this form of energy were discussed. At the second session the operation of equipment and treatment procedures were demonstrated and an opportunity was provided for practice of technics of application.

The *San Jose District* of Northern California is presenting a series of six scientific program sessions on the subject of the hand. Five meetings will include presentations by a physician, specializing in hand surgery, physical therapists, and occupational therapists. The sixth session will be a work-shop at which an expert in plastics will give instruction in working with plastics, and an

opportunity will be given for members to fashion hand splints under his direction.

New Student Members

Albany Hospital

Toby Ackerman
E. Dian Culver
Mary J. Delehanty
Judith V. Graham
Margaret M. Keegan
Alexandra Maynard
Patricia A. Moravetz
Gertrude Oliver
Myrna P. Rothenberg
Roxane B. Taggart

Bouvé-Boston School

Zoe Birren
Roberta M. Brodsky
Margaret E. Canty
Ann T. Carrington
Margaret A. Ciarfella
Carol R. Clements
Ethel J. Cockey
Margaret A. Crumb
Pauline L. Demers
Jacqueline A. Drouin
Erema D. Feinstein
Jane M. Forbush
Elizabeth A. Gibb
Mary H. Goodrich
Barbara I. Gorman
Ann T. Haley
Marie A. Heffernan
Janet A. Jacobs
Jean E. McIntosh
Barbara J. McWhorter
Sarah E. Ridley
Lilly A. Stafford
Margaret C. Thompson
Eleanor E. Tully

Charity Hospital

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Billy E. Christmas
Patricia L. Harold
Chris M. Pastor
Maxine G. Reiser
Marilyn L. Richey
June N. Thomas
Sylvia F. Von Osthoff
Olen Wilford

Children's Hospital

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Jo Ann G. Benard
Sheila P. Broveleit
Ronald D. Brown
Gail Burns
Barbara N. Gillson
Marjorie G. Huber
Paula C. Jones
Donald Kimble
Sachiko Kuratimi
Janet M. Phelps
Suzanne J. Sublette
Irene Suzuki
Betty A. Tasker
Mary P. Wolf

Columbia University

Stanley Adelsberg
Maya Andrau
Roslyn Applebaum
Patricia Campbell
Irene Curtis
Alice Eason
Judy Gracia
Evelyn Kwok
Patricia Lincoln
Patricia A. McCargar
Barbara L. Mitchell
Muriel Omdahl
Barbara Roh
Roberta Roifer
Ellen Schoenig
Nancy Sharpe
Ann Shipman
Ruth T. Slade
Janice Smith
Katherine Suydam
Leanne Taintor
Mary Trenkamp
Florence Van Liew

Hermann Hospital

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J. R. Christian
John C. Deane
Ilda N. Erwin
Elliott T. Fleming
Roy N. Gatian, Jr.
Ann L. Morris
Roderick A. Muntz
Paul J. Murphy
Judith I. Nelson
Patricia A. Nestor
Don M. Newton
Gary M. Newton
Charles J. Opersteny
Garland A. Picou
Leo Schwartz
Robert Singer
Robert C. Smith
Cloyd F. Staples
Joan W. Starring
James M. Thedford
J. L. Van Deusen
Jack C. Ward
Mary N. Wentzell
Joyce A. Wood

Medical College of Virginia

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Janet O. Childers
Inga G. Christensen
Betty F. Conway
William J. Cowan
Charlotte F. Daniels
Patty H. Dunn
Ruth A. Dupree
Mary L. Glenn
Peggy J. Grubb
Helen S. Harper
James C. Hart, Jr.
Janice A. Heidenreich
Sue D. Hylton
Ellwood C. Jackson
Phillip F. Jackson
Martha L. Johnson
Marianne E. McDonald
Patricia P. McGee
Lois E. McNutt
Marilyn M. Miller
Anita G. Mills
Roberta J. Morrey
Doris A. Newcombe
Marcia H. Prince
Laurie S. Redick
Marcia K. Rusher
Marilyn T. Schaffner
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Shirley A. Totten
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Northwestern University

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Jane Forster
Phyllis E. Hillery
Patsy R. Kimpel
Dudley W. Kramer
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Herman T. Shelton
Sister Mary Ann Grasso
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Ester Z. Yanof

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Antonio B. Maienza
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Susanne C. Weber
Arnold B. Wilson

Letter to the Editor

THE SOCIETY FOR THE REHABILITATION OF CRIPPLED CHILDREN
CHILDREN'S ORTHOPEDIC HOSPITAL

Telephone: 41168

Haji Ali Park
Opp. Willingdon Sports Club
Clerk Road, Mahaluxmi, Bombay
September 24, 1956

The Editor,
The Physical Therapy Review
1790 Broadway, Room 310
New York 19, New York, U.S.A.

DEAR MADAM:

My attention has recently been drawn to an article in the Physical Therapy Review of March 1955 which states:—"In India there is no physical medicine as such, with trained Indian Therapists; there is only the S.R.C.C. ".

While fully appreciating that your Journal does not assume responsibility for statements contained therein, I feel that the following facts should be given.

1. The Society for the Rehabilitation of Crippled Children employs at the Children's Orthopedic Hospital in Bombay fourteen ex-army physiotherapy personnel who, originally trained by a team of members of the Chartered Society, have for the last nine years been receiving further training in recent advances of physical therapy with particular attention to Polio and C.P. techniques.

2. A Physiotherapy School, sponsored by the World Health Organization opened in 1952 at the King Edward Memorial Hospital in Bombay. Graduates from that School are now employed in various hospitals.

3. A Physiotherapy School has been formed at Anand under the auspices of the Christian Medical Association.

There are also a number of Indian Physiotherapists who have received training in other countries and are now practicing in this country.

It is true that, as in other countries, there are many poorly trained and untrained "Physiotherapists" in this country and India is far behind the west in the supply of trained personnel, but the statement that even in 1955 there were no trained therapists is inaccurate.

Yours faithfully,

Signed: Dr. Mrs. Gulbanoo Premji
Hon. Secretary & Administrator

MS.gp.

Physical Therapy School of Ohio State University

This Is Your Invitation to Visit Number Thirty-Seven *

The high hopes of Ralph E. Worden, physiatrist, who was trained at Mayo Clinic, did not quickly fade into dreams when he conceived the idea of establishing a new physical therapy school at Ohio State University back in 1950. With the help of Miss Gladys G. Woods, who will be Technical Director of the school it is a reality now!

With today's advances in the program of medicine figuring prominently in the American consciousness, the successful planning and development of great modern medical centers are evidence of old needs with new opportunities.

We are proud of the Health Center at Ohio State University where the functions include teaching, research, and patient care. On the second floor of this eleven story new modern hospital space, staff, and equipment were allocated in 1955 for the new Physical Therapy School in connection with the large Physical Medicine and Rehabilitation Department.

The thoughts and plans which went into the development of the school were many. Geographically, Columbus is a good location due to a neighboring zone of student source of supply. Ohio State University is the sixth largest university in student enrollment and has one of the top academic ratings; therefore, it is able to supply all basic and prerequisite courses for the professional work. The Health Center is located on the campus.

A curriculum was prepared and submitted to the Arts and Science College and to the College of Medicine. Each college appointed a subcommittee to work with us in developing the program. Courses had to be named, credits evaluated and assigned, prerequisites declared, and a qualified staff guaranteed. A budget was designed for approval. The next channels were through the Council on Instruction, then to the President of the University for submission to

* The Physical Therapy School of Ohio State University is the thirty-seventh school to be approved by the Council on Medical Education and Hospitals of the American Medical Association.

the Board of Trustees. This took three years of patience and a constant and sincere interest of the "subcommittees of subcommittees" who wanted a sound program and to maintain our high standards. Then many colleges wanted to grant a degree in our field but did not wish to sacrifice their already inadequate budget. "Anything good is worth fighting for" continued to be our motto.

The school was in successful operation during 1955/56. Our enrollment is near maximum now and plans are on the drawing board for the new rehabilitation building which will also include space for classrooms and research. With this added facility to the Health Center, which already services over 1,400 hospital bed patients, growth and continued development appear eminent.

The members of the first graduating class (September 1956) feel they have been fortunate in many respects. They have liked their instruction periods, observation, clinical practice, and the encouragement from the many physical therapists in Columbus who represent 14 different physical therapy schools—the oldest therapist being 66 years young, and the youngest therapist, 20 years old. The students have appreciated the instruction of 41 different physicians who have willingly given of their time to broaden the students' knowledge.

A few memories about a year of questions from the students:

Where do I buy my football tickets?

The medical students have asked me to become a member of their national honor society fraternity, is it ethical for a girl P.T. student to do this?

Why can't you wash the ultraviolet lamp with just water?

What is a physiatrist?

My patient wants a date, what do I tell him?

Which is the longer wave length, ultraviolet or ultrasound?

Just what is reciprocal innervation?

I'm being a subject for Dr. Stow's research, will it hurt, and do you think it will help my physics grade?

May I work longer clinical hours and finish a week early, my girl wants to get married that day?

Which job should I accept?

When will a Masters Degree in Physical Therapy be offered here at *our* school?

Eight of the ten students who started in September finished, three with university honors. Of the two who were lost, one was married and the other was forced to delay completion due to a severe eye condition. The stork visited our one married student, and wedding bells will ring within the year for all the others, but *all* plan to stay in the profession. This first class, a proud group of students, selected a pin to identify themselves with their university and their future colleagues, but we will always remember that first class as proof of a good dream come true.

Medical Motion Picture Workshop

The Calvin Company, Incorporated, in cooperation with the Veterans Administration, is offering a Workshop on February 4, 5 and 6, for medical film producers, audio visual personnel, and other persons interested in the use and value of films in the various field of medicine, in factual information regarding film production, and in information on application of films in education. The meeting will be presented on the sound stages of the Calvin Company, Kansas City, Missouri, and will be devoted to discussions and screenings to assist photographers and producers in their specialized fields. Tuition fees of $60.00 cover all sessions and a banquet. Participants must arrange their own hotel reservations. Registration is open to the public. Further information and registration forms are available from: Medical Motion Picture Workshop, The Calvin Company, 1105 Truman Road, Kansas City 6, Missouri.

New York University Physical Therapy Alumni Association Formed

One June 21, at the Institute of Physical Medicine and Rehabilitation in New York City, 58 graduates of the New York University School of Physical Therapy voted to form an Alumni Association. The therapists gathered together at a social following a meeting of the World Congress for Physical Therapy. A committee was formed to organize the Alumni Association and contact all graduates in the field.

Those interested in becoming members may receive further information by writing to either of the following:

Jay Schleichkorn, Chairman
39 Regina Road, Farmingdale, N. Y.
or
Miss Edna Wolf
191 Cathedral Avenue, Hempstead, N. Y.

General News

National Foundation for Infantile Paralysis Appoints New Medical Director

Dr. Thomas M. Rivers of New York City, formerly vice president of the Rockefeller Institute for Medical Research, has been appointed medical director of the National Foundation for Infantile Paralysis, it was announced by Basil O'Connor, president of the March of Dimes organization.

He succeeds Dr. Hart E. Van Riper, who is leaving the National Foundation on October 31 to become medical director of Geigy Pharmaceuticals of Ardsley, N. Y. Dr. Van Riper joined the National Foundation staff in 1945 and became medical director in 1946.

Mr. O'Connor paid tribute to Dr. Van Riper, saying: "All of us regret his departure exceedingly, after 11 fruitful years with the National Foundation. We were fortunate to have had such a dedicated and gifted physician at the helm of the medical department during the crucial years of vaccine development and improved patient care.

"We also are fortunate that, in these years, Dr. Rivers worked closely with Dr. Van Riper, so that the continuity of our still unfinished fight against polio will not be broken."

Dr. Rivers, who has been closer scientifically to the development and testing of the Salk vaccine than anyone except Dr. Jonas E. Salk himself, took over his new post on November 1, exactly one year after joining the National Foundation's professional staff as assistant to Mr. O'Connor.

From 1938 to 1955 he was chairman of the National Foundation's Committee on Virus Research and Epidemiology, serving on a voluntary basis; he was also chairman of the Vaccine Advisory Committee that assumed final responsibility for the decision to undertake the 1954 vaccine field trial in which 1,830,000 children participated, the largest test of its kind in medical annals.

Dr. Van Riper, whose role in the fight against polio was cast after his own wife was stricken with the disease, was a leader in the development of the National Foundation's pioneering programs of patient aid, scientific research, and professional education.

A native of Kirkwood, Ill., Dr. Van Riper received his medical degree at the University of Pennsylvania in 1930 and practiced pediatrics in Madison, Wis. He was assistant director of maternal and child health in the Children's Bureau, U.S. Department of Labor from 1941 to 1944, when he became medical director of the Jackson Memorial Hospital in Miami, Fla. He resides at 103 East 75th St., New York City, with his wife, the former Mary Virginia Smith of Washington, D.C., and three children: Mary Hart, 16; David, 14; and Christine, 12.

Dr. Rivers is a native of Jonesboro, Ga., and lives with his wife, Teresa, at 163 Greenway South, Forest Hills, L.I. For more than 30 years before he joined the National Foundation staff he was a member of the Rockefeller Institute. During his tenure he served as trustee, vice president, and director of the hospital and laboratories.

Dr. Rivers' association with the development of the Salk vaccine culminated a career dedicated to the investigation of one of man's tiniest and deadliest enemies, the virus. When he began his work he was one of a mere handful of virologists, and his efforts were directed not only to research on viruses but toward increasing the number of scientists trained in this highly specialized field.

Dr. Rivers has been a member of the New York City Board of Health for the last 17 years. He also is president of the Society for Experimental Biology and Medicine. Since 1934 he has held membership in the National Academy of Sciences.

He is a 1909 graduate of Emory College, then in Oxford, Ga., and took his medical degree in 1915 at Johns Hopkins University. He served both in World Wars I and II and for his achievement as commanding officer of the U.S. Naval Medical Research Unit No. 2 on Guam was made a commodore in 1945 and given the Legion of Merit Award. In 1955 he attained the rank of rear admiral in the Navy Medical Corps Reserve (Retd.).

Among his books is "Viral and Rickettsial Infections of Man." He is the discoverer of Bacillus Parainfluenza and Virus III infection in rabbits.

The Second World Rehabilitation Film Awards

Recognition of the importance of the medium of film presentation in advancing all aspects of the work for the world's physically handicapped will be stressed again during the Seventh World Congress of the International Society for the Welfare of Cripples, to be held in London, July 22-26, 1957, when the World Rehabilitation Film Awards will be announced for the second time. The producers of the film taking first place will

(continued on page 835)

Physical Therapy Programs—1956

APPROVED BY THE COUNCIL ON MEDICAL EDUCATION AND HOSPITALS
OF THE AMERICAN MEDICAL ASSOCIATION

Schools offering the four year program leading to a baccalaureate degree will accept high school graduates, *as well as transfer students.* Schools offering the 12 to 16 months program leading to a certificate will accept students who have completed all or most of their undergraduate work providing they meet certain course requirements. Recipients of a degree or certificate have equal professional recognition and status. For specific information regarding each school's entrance requirements, tuition, and other fees, please write to the director indicated below. All students should investigate course requirements *early*.

	Degree	*Certificate*
CALIFORNIA		
Mrs. Mary J. Dodge School of Physical Therapy Childrens Hospital Society 4614 Sunset Boulevard Los Angeles 27		†
Mr. R. William Berdan School of Physical Therapy College of Medical Evangelists 312 N. Boyle Avenue Los Angeles 33	†	†
Mrs. Margery L. Wagner Curriculum in Physical Therapy University of California The Medical Center San Francisco 22	†	†
Miss Charlotte W. Anderson Department of Physical Therapy University of Southern California University Park Los Angeles 7	†	†
Miss Lucille Daniels Division of Physical Therapy Stanford University Stanford	†	†
COLORADO		
Miss Dorothy Hoag Curriculum in Physical Therapy University of Colorado Medical School Denver 20	†	†
CONNECTICUT		
Miss Frances Tappan School of Physical Therapy U 101 University of Connecticut Storrs	†	
ILLINOIS		
Miss Elizabeth C. Wood Course in Physical Therapy Northwestern University Medical School 303 East Chicago Avenue Chicago 11	†	†
IOWA		
Mrs. Olive C. Farr School of Physical Therapy State University of Iowa University Hospitals Iowa City		†
KANSAS		
Mrs. Ruth G. Monteith Section of Physical Therapy University of Kansas Medical Center Kansas City 3	†	†
LOUISIANA		
Miss Isadore Brown (Acting) School of Physical Therapy Charity Hospital of Louisiana 1532 Tulane Avenue New Orleans 12		†
MASSACHUSETTS		
Miss Shirley M. Cogland *School of Physical Therapy Simmons College-Children's Hospital 300 Longwood Avenue Boston 15	†	†
Miss Adelaide L. McGarrett Curriculum in Physical Therapy Sargent College, Boston University 6 Everett Street Cambridge 38	†	†
Miss Constance K. Greene Curriculum in Physical Therapy *Bouve-Boston School, Tufts College Medford 55	†	
MICHIGAN		
Miss Virginia Wilson Curriculum in Physical Therapy University of Michigan University Hospital Ann Arbor	†	†
MINNESOTA		
Mrs. Ruby M. Overmann Course in Physical Therapy University of Minnesota 860 Mayo Memorial Hospital Minneapolis 14	†	
Mr. Darrell D. Hunt School of Physical Therapy Mayo Clinic Rochester		†

* Accepts women students only

	Degree	Certificate
MISSOURI		
Sr. M. Imelda, S.S.M. Course in Physical Therapy St. Louis University 1325 South Grand Boulevard St. Louis 4	†	
Miss Beatrice F. Schulz Department of Physical Therapy Washington University School of Medicine 660 So. Kingshighway Blvd. St. Louis 10	†	
NEW YORK		
Miss Dorothy L. McLaughlin *School of Physical Therapy Albany Hospital-Russell Sage College New Scotland Avenue Albany 1	†	†
Miss Mary E. Callahan Courses for Physical Therapists Columbia University College of Physicians & Surgeons 630 West 168th Street New York 32	†	†
Miss Elizabeth C. Addoms Physical Therapy Curriculum School of Education, New York University Washington Square East New York 3	†	†
Miss Mildred F. Heap Program in Physical Therapy University of Buffalo 2183 Main Street Buffalo 14	†	†
NORTH CAROLINA		
Miss Helen Kaiser Division of Physical Therapy Box 3403, Duke Hospital Durham		†
OHIO		
Mr. Robert D. Kruse Course in Physical Therapy Frank E. Bunts Educational Institute 2020 East 93rd Street Cleveland 6		†
Miss Gladys G. Woods Curriculum in Physical Therapy Ohio State University Columbus	†	†
OKLAHOMA		
Miss Thelma Pedersen School of Physical Therapy University of Oklahoma, Medical Center Oklahoma City 4	†	†

*Accepts women students only.

	Degree	Certificate
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Miss Kathryn Kelley Curriculum in Physical Therapy D. T. Watson School of Physiatrics Leetsdale		†
Miss Dorothy E. Baethke Division of Physical Therapy University of Pennsylvania 1818 Lombard Street Philadelphia 46	†	†
PUERTO RICO (All classes given in Spanish)		
Mrs. Lutgarda Vega School of Physical & Occupational Therapy Professional Bldg., 8th floor Stop 22, Santurce		†
TEXAS		
Miss Doris E. Porter Grady Vaughn School of Physical Therapy Baylor University Hospital Dallas 1		†
Miss Ruby Decker Curriculum for Physical Therapists University of Texas, Medical Branch Galveston	†	†
Mrs. Cecelia J. Lee School of Physical Therapy Hermann Hospital Houston 25		†
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U. S. ARMY MEDICAL SERVICE		
*Physical Therapy Course Medical Field Service School Brooke Army Medical Center, Fort Sam Houston, Texas and Brooke, Letterman and Walter Reed Army Hospitals Write to: The Surgeon General Department of the Army Washington 25, D. C. Att.: Personnel Division		†

Please direct all inquiries regarding tuition, entrance requirements and other specific information to the school and *not* to the American Physical Therapy Association.

Abstracts

Prognosis in Dislocations of the Shoulder

Carter R. Rowe. Shoulder Clinic, Massachusetts General Hospital, Boston. J. BONE & JOINT SURG., 38-A: 957-977, October 1956

Five hundred shoulder dislocations in a series of 488 patients, with a follow-up study on 313 shoulders (63 per cent), were reviewed relative to prognosis. The study included patients treated over the past 20 years, with a mean follow-up period of 4.8 years.

In 38 per cent of the patients the dislocation recurred. Primary shoulder dislocations were found to occur as frequently after 45 years of age as before 45. The incidence of recurrent dislocation of the shoulder was very high in the second decade (92 per cent), but showed marked decrease after age 50 (12 per cent). The age of the patient at the time of the primary shoulder dislocation was the most significant single prognostic factor. Throughout this study, the average age of those patients in whom redislocation did not occur was greater than in those in whom dislocation did recur.

Various phases of trauma in relation to dislocations were reviewed. Usually the greater the initial injury, the lower was the incidence of recurrence. Fracture of the shoulder girdle was a complication in 24 per cent. The incidence of fracture of the greater tuberosity was 15 per cent. This complication was accompanied by an appreciable lowering of the incidence of recurrence (7 per cent). The exception was in chip fractures of the anterior glenoid rim. Humeral-head defects were present in 38 percent of the primary dislocations and in 57 per cent of recurrent dislocations. These were associated with an increase in the incidence of recurrence (82 per cent).

From the figures, presented in the study the incidence of recurrence seemed to be affected very little by the type and length of immobilization of the shoulder following dislocation. Although a high incidence of recurrence was noted in the group of patients for whom there was no immobilization or for whom there were very short periods of immobilization, long periods of immobilization were not associated with a significant decrease in recurrence.

The incidence of recurrent dislocation relative to handedness was not significant. Following primary or initial dislocation, 70 per cent of the dislocations which recurred did so within two years. Following operative procedures for the repair of recurrent shoulder dislocation, 52 per cent recurred within two years after operation.

The incidence of posterior dislocation was 2 per cent. The incidence of bilateral dislocation was 2.4 per cent. The incidence of associated nerve injury was 5.4 per cent.

Myocardial Infarction Treated by Early Ambulation

Pekka Brummer, Eino Linko, and Antero Kasanen. Medical Clinic of the University Turku, Finland. AM. HEART J., 52: 269-272, August 1956

The "armchair treatment" of myocardial infarction as suggested by Levine has gained wide acceptance in recent years. In this treatment the patient, immediately following recovery from the state of shock, is allowed to sit in a chair, at first for a short time and later for a gradually increasing part of the day. Ambulation is usually started three to four weeks after infarction.

Irvin and Burgess recommend still earlier ambulation. They consider two weeks of bed rest sufficient in most cases. This is followed by two weeks of gradual and progressive ambulation. The total length of hospitalization would be limited to four weeks.

At the Medical Clinic of the University of Turku since the summer of 1952 shorter and less strict bed rest has been prescribed for these patients. The patients have been permitted to sit up in bed immediately after the state of shock has subsided. Bedside toilet privileges have also been allowed at an early stage. Two weeks after infarction, if no special contraindications are present, the patients have been allowed to begin ambulation. One week later they have been dismissed from the hospital. In order to evaluate the results of this therapy a study was made of the patients treated in this clinic during the latter half of 1952 and during 1953 and 1954.

From this study it is apparent that no immediate hazard to the patient is associated with ambulation after a bed rest of two weeks only. It was felt that the patients maintained their physical conditions better and regained their normal activity sooner than patients under the old regimen of prolonged bed rest.

Congenital Postural Scoliosis

Denis Browne. PROC. ROY. SOC. MED., 49: 395-398, July 1956

The name of the condition described in this paper indicates that the scoliosis is present at birth. The posture must have been abnormal before birth with the child lying bent to one side. It is the opinion of the author that the condition known as "idiopathic scoliosis" originates as this sideways bend in utero. This hypothesis is not generally accepted because of the omission of "orthopedics of the fetus" in orthodox orthopedic teaching and because the deformity is extremely inconspicuous in its early stages.

The curve is nearly always concave to the right because of the usual preponderance of muscular strength on that side. The muscles on the concave side because of their shortened condition have a mechanical and physiological advantage in pull over those which are stretched on the convex side. When the body weight is added to this advantage as the child sits up and walks, the curve tends inevitably to increase, and as it increases so does the advantage of the one side over the other. The result is the well known progressive and accelerating deformity which ends in an extreme scoliosis. The author feels that there is an additional causative factor which he calls "pressure dysplasia." By this he means an interference with the growth and with the power of subsequent growth of bones and joints caused by abnormal forces in utero. This same factor is present in clubfeet.

The diagnosis of this condition is primarily by observation. If the baby is placed in a prone position and stimulated in various ways, it will be noticed that he will turn freely to one side and that nothing will stimulate him to curve his spine to the other side. A very definite difference will be found in forced bending to right and left. In addition, transverse wrinkling of the skin is usually present on the concave side.

The prognosis is good if the condition is found and treatment started

before walking has begun. A really satisfactory result is impossible after this very early age. The principle of "controlled movement" is the basis of treatment for congenital postural scoliosis. This consists in preventing by various devices the movements which tend to maintain or increase the deformity, at the same time allowing and encouraging those which do no harm, or which correct it. The author feels that it is unfortunate that at the present time the classical technic of correction consists almost entirely of immobilization, which has no effect on the disturbance of muscle balance, removes the indispensable stimulus of movement to correct growth and, in addition, atrophies the muscles and stiffens the joints. A splint has been devised which allows the child to perform almost any movement, and prevents the spine from returning to its primitive scoliosis. He is kept in this apparatus continuously, being taken out only for washing, manipulations, and exercise. Only when the child will turn as readily and as far to one side as the other, and when the spine appears straight on sitting up, is he allowed to take the erect position and learn to walk.

Proceedings of Royal Society of Medicine, The Editor, 1 Wimpole Street, London, W 1.

Bronchiectasis: Concepts of Therapy

Charles N. Bean, Iowa City, Iowa, DIS. CHEST, 30: 202-206, August 1956

The classical impressions of bronchiectasis are reviewed in this paper. The author stresses the changes in concepts of this disease in recent years. He feels that the gloomy prognosis of bronchiectasis and the early recommendation for surgery are not justified in more than a small percentage of patients. With this in mind he discusses the diagnosis of the disease, its etiology, symptoms, physical signs, and the two major fields of therapy, surgery, and conservative therapy.

The goals of therapy are listed as: (1) relieve the patient of his symptoms, (2) prevent complications, and (3) prevent spread of disease to other lobes. In surgery the removal of the involved segments fulfills these goals. Conservative therapy consists of postural drainage, antibiotics, physical therapy (breathing exercises), bronchoscopy when needed, and measures for general good health. Postural drainage is discussed more fully. Reference is made to an article by Kane and Irving on a routine of simple positions that are designed to drain the lung from each specific bronchopulmonary segment. These are done with a minimum of uncomfortable movements of the patient and appear quite effective. Mention is made of deep breathing exercises. It is felt that before recommending surgery, each physician should carefully weigh the goals and attain them by the best means available.

A Clinical Study of the Motor Paralytic Bladder in Poliomyelitis

B. G. Clarke, Boston, Mass., J. UROL., 76: 66-69, July 1956

In spite of the relative frequency of urinary retention in patients with poliomyelitis there is little material in the literature on which to base an understanding of the physiological disturbances that occur.

In 13 patients, bladder paralysis appeared concurrently with peripheral skeletal muscle paralysis during the acute, febril stage of poliomyelitis. Distribution of peripheral paralysis had no relation to segmental location of bladder motor innervation.

Among the adults capable of describing sensation, micturitional disturbances assumed the form of painful urinary retention. Large volumes of residual urine were obtained. Ileus of varying degrees of severity developed concurrently with difficulty in voiding. In two patients who died, no histological abnormality of the muscle, nerves, or ganglia of the bladder wall could be found. Paralysis of the abdominal striated muscles was present in only half of the patients.

The authors found indications that the urinary retention of poliomyelitis was the result of detrusor weakness without sensory loss. It may simply reflect motoneuron changes, usually reversible, in the lateral columns of the sacral segments of the spinal cord, from which originate the parasympathetic motor nerves of the bladder.

In surviving patients, normal bladder function returned during defervescence and beginning recovery from skeletal muscle paralysis. In the younger patients, simple measures such as manual expression of the bladder, administration of parasympathomimetic drugs, or one or two catheterizations sufficed for treatment. In the adults, indwelling catheter drainage during the phase of bladder paralysis was used successfully until return of normal bladder function.

Paralytic Scoliosis

Robert Roaf, Owestry, England, J. BONE & JOINT SURG., 38-B: 640-659, August 1956

The etiological factors concerned in paralytic scoliosis are complex. Four main types of paralytic scoliosis can be recognized.

1. The general C-curve due to the body's anatomical attempt to shift its center of gravity towards the weaker side. Vertebral rotation is not usually marked. This type usually occurs when patients with relatively slight paralysis have been allowed up too early; it does not usually progress to severe deformity but may occasionally do so, gradually changing into type 2. The C-curve type usually responds well to a period of rest and muscle redevelopment in recumbency. It also responds favorably to correction and fusion because correction is easy and there is little tendency to deterioration. Many of the "successes" of correction and fusion are in this class—almost equal success would often have been gained without "correction." The spine is slightly, but not very, unstable and a relatively localized fusion will give the little extra support that is needed.

2. The "general collapse" type of curve due to extensive spinal weakness. This is the type in which simple head suspension produces marked correction. Rotation is moderate. Provided the patient's general condition is satisfactory, extensive spinal fusion is usually the best treatment and produces gratifying improvement.

3. The primary lumbar curve due to a combination of pelvic obliquity, extraspinal imbalance, and imbalance of the deep rotator muscles. Rotation is usually marked. Treatment must include the correction of all these factors. In mild cases correction of the pelvic obliquity is enough, but in marked cases the spine must also be corrected. The disability from a lumbar paralytic scoliosis is much greater than that from a lumbar ido-

pathic scoliosis of the same degree; so correction is necessary in this type. Correction in a Risser-type jacket is often inadequate and recourse to operative procedure is usually required.

4. The primary thoracic curve is often associated with weakness of the scapular muscles. The indications for and methods of treatment are practically the same as in primary idiopathic thoracic curves. These curves tend to be progressive and uncompensated. Although the most popular treatment is correction and fusion, wedge osteotomy of the spine gives better results in intractable cases.

The main need is for further investigation into the etiology of paralytic scoliosis so that adequate preventive measures may be undertaken at an early stage. It is essential that every child who contracts poliomyelitis should have his back muscles examined before he gets up. If there is any suggestion of scoliosis further investigations including radiography and electromyography are essential.

Hypokinetic Disease—Role of Inactivity in Production of Disease

Hans Kraus, Bonnie Prudden (Hirschland), and Kurt Hirschhorn, New York University, New York, BRIT. J. PHYS. MED., 19: 180-185, August 1956

Studies in the field of therapeutic exercise indicate that many orthopedic disabilities and neuromuscular tension syndromes are due to underexercise. When comparing the well-exercised person to one who is substrength, it has been found that the physically active person has lower neuromuscular tension, lower absolute and relative weight, lower blood pressure, lower pulse rate, greater adrenocortical reserve, greater muscle strength and flexibility, and greater vital capacity. The substrength person shows signs and symptoms of aging earlier in life, exists physiologically at a lower potential, and is less well equipped to maintain homeostasis and to meet the stress of daily living. The term "hypokinetic disease" is used to describe the conditions prevalent in the physically inactive. The "hypokinetic diseases" discussed are coronary heart disease, duodenal ulcer, diabetes, psychiatric difficulties, and low back pain. Six simple exercise tests for strength and flexibility of key posture muscles are described and illustrated. Since the number of "muscular low back patients" is constantly on the increase, since there is an increasing quota of draft rejections, and since there is an increasing state of emotional instability in large sections of our population, the authors became interested in gaging the muscular fitness of our population.

From their studies of school children, it was found that American school children are considerably weaker and much less flexible than comparable groups of children in physically more active and less mechanized populations. The studies also show that children in American independent schools where sufficient time is given to exercise are stronger and more flexible than children in American public schools. It is felt that this difference is entirely due to lack of sufficient physical activity. It can be predicted that there will be an increase in the rate of "hypokinetic disease," in orthopedic difficulties, of emotional instability, and a decrease in the number of American young people able to carry on an active, aggressive and productive life, and able to serve their country in the Armed Forces.

What can be done to improve this situation? It is suggested that tests for muscle strength and flexibility be incorporated in routine physical examinations, that physical activity or exercise be incorporated in prescriptions, that "rest" should not be overused as a prescription at any stage of disease, and that physical education be expanded with active participation on a wider basis.

Diagnosis and Treatment of the More Common Congenital Cardiovascular Anomalies

Allen H. Kline, Baltimore, Md., DIS. CHEST, 30: 172-182, August 1956

Because of the vast surgical advances in congenital heart abnormalities in recent years and because many of these patients receive exercise postoperatively, this article is of interest to physical therapists. Various diagnostic tests are discussed. These include elctrocardiography, angiocardiography, catheterization, and oximetry. The more common congenital cardiovascular diseases are classified under three main groups: (1) extracardiac, (2) noncyanotic, and (3) cyanotic. Under the extracardiac anomalies are discussed patent ductus arteriosus, coarctation of the aorta, and vascular rings. Atrial septal defect, ventricular septal defect, and pulmonary stenosis are described in the second group, and the third group includes tetralogy of Fallot, complete transposition of the great vessels, tricuspid atresia, Eisenmenger complex, and Taussig-Bing malformation. A brief description of each condition is given. This is followed by the symptoms, signs, diagnostic tests, and surgical treatment. (No further address is given, but it is stated that the bibliography will appear in reprints.) Address of journal is 112 East Chestnut Street, Chicago 11, Ill.

Opponens Transfer

Ian Macnab, Toronto, Canada, CANAD. M.A.J., 75: 194-198, August 1, 1956

In order to restore opposition of the thumb in polio patients, the orthopedic service of the Toronto General Hospital has used the following basic procedure. The flexor digitorum sublimis tendon of the middle or ring finger is inserted at the neck of the first metacarpal. The flexor sublimis chosen must be of normal or near normal power and the flexor profundis to the same finger must be of normal strength.

Opposition of the thumb and the ability to pinch and grasp depends not only upon the opponens pollicis, but also on the abductors of the thumb, the short flexor, the adductor pollicis and the first dorsal interosseous. In order to insure a successful outcome of the operation, these other muscles must be assessed carefully; if they are weak or paralyzed, their actions must be reinforced or replaced.

If the abductors are paralyzed no true opposition is possible. The tendon of the palmaris longus may be grafted to the head of the first metacarpal and used as an abductor.

The ability of an opponens transfer to restore a powerful pinch between the thumb and the fingers will depend partly on the strength of the short flexor and the adductor of the thumb. If the abductor and the flexor pollicis brevis are both paralyzed, the tendon transfer should be combined with fusion of the interphalangeal joint of the thumb in extension.

If the first dorsal interosseous is paralyzed, opponens restitution

should be combined with an attempt to restore abduction of the index finger. This can be achieved by transferring the flexor sublimus tendon of the middle finger to the first dorsal interosseous.

Rehabilitation is begun 34 days after transfer of the flexor sublimis for opposition of the thumb.

Peripheral Circulatory Disturbances—Treatment by Massage of Connective Tissue in Reflex Zones M. Ebner, Vienna University, BRIT. J. PHYS. MED., 19: 176-180, August 1956

This type of massage was originated by Elizabeth Dicke of Germany in 1929. At that time she was suffering from a severe disturbance in the peripheral circulation of her right leg which caused extreme pain in that extremity and also in her back. She tried to give herself some relief by stroking over the painful areas of her back. At first the simple stroking with her fingertips caused great pain, however, gradually the tension subsided, the pain in the back eased and an agreeable sensation of warmth took place. With continued massage of this type the superficial venous circulation gradually reappeared in the thigh and leg. After three months' treatment the severe symptoms subsided, and after a year she was able to resume her occupation as a physical therapist.

The massage technic is described as a special stroking performed by the ring and middle fingers. This produces movement of the skin on the underlying tissue. A tensile strain is thus inflicted on the subcutaneous and interstitial connective tissue. This tensile strain produces a nervous stimulation which influences the circulation in the segment being treated. The main treatment area is always the back from which the segmental nerve roots originate.

The anatomical basis of this type of massage is the segmental development of the human body. A sound basic knowledge of the dermatome and the myotome is therefore essential. It has been found that cutaneous changes and changes in muscle occur in segments which share the same root supply with a pathologically affected organ. Certain cutaneous zones, therefore, belong quite definitely in their innervation to certain viscera. These zones correspond to the "maximal points" as mentioned by the German authors describing this massage technic.

The tissue responsible for these changes appears to be the connective tissue. Segmental nerve distribution, nervous pathways and the function of connective tissue as an organ of metabolism are each discussed from the standpoint of background for this type of massage.

The skin reaction to the stroking finger varies according to the condition—normal tissue, tissue under increased tension and the tissue where there is a peripheral circulatory disturbance. It changes with improvement of the condition and is a reliable guide as to the success of the treatment.

First of all the general contour and surface of the back is inspected for areas of indentation and areas of elevation, which are considered significant from a treatment point of view. The sensations of the patient to the finger stroking are also used as criteria of the beneficial effects achieved. Two case histories illustrating successful treatment with this type of massage are included in the article.

Diabetic Charcot Joints

J. G. Bolen, Battle Creek, Mich., RADIOLOGY, 67: 95-98, July 1956

Two cases of neuropathic changes in the joints of the foot (Charcot joints) associated with diabetes mellitus were described in a 39-year-old woman and a 43-year-old woman. The right leg was amputated at a point 6 inches below the knee in the younger patient and a mid-thigh amputation was performed in the older patient.

The causation of neuropathic joint changes in the feet of patients with diabetes mellitus is unknown, but theories regarding the origin of the condition include diminution of blood supply, peripheral neuritis, and extension to bone from a soft-tissue infection. The process usually begins after several years of poorly regulated diabetes. Early signs and symptoms include relatively painless swelling of the tarso-metatarsal region with gradual eversion of the foot.

The disease progressed slowly to partial or complete necrosis of the tarsal bones and obliteration of their normal joint relationship as revealed by radiographic studies in the two cases reported here. No specific treatment of the joint lesions in diabetes is efficacious.

A review of the literature revealed that the condition was apparently arrested by lumbar sympathectomy in two patients. Some benefit from immobilization of the foot and ankle by orthopedic appliances to prevent weight bearing and further deformity was also reported. To obviate the extreme difficulty of regulating diabetes mellitus in the presence of a chronic infection and to relieve pain and deformity, the affected extremity is often amputated, as in the cases reported in this article.

Reserpine in Cerebral Palsy

R. R. Harris and E. H. Rowley, Cerebral Palsy Institute, Norman, Okla., J. PEDIAT., 49: 398-400, October 1956

The effects of tension, emotional disturbance, and abnormal behavior patterns make the problem of treating children with cerebral palsy an extremely difficult one. Quite often physical therapy is delayed when children enter a training center because they require long periods of adjustment to a new environment. It is difficult to achieve optimal results unless these patients are sufficiently relaxed.

Many drugs have been used to facilitate the training of children with cerebral palsy but all have had limitations. In this study reserpine was evaluated in a few selected cases of cerebral palsy and the preliminary results were sufficiently promising to warrant further study.

The initial study involved 27 children ranging in age from 2 to 12 years. Types of cases included spasticity, rigidity, ataxia, and a variety of athetoids. All children were kept under close observation and served as their own controls. This pilot group allowed the investigators to study dosages and to estimate the duration of effects of reserpine. A second study was then undertaken involving 42 children with cerebral palsy of various kinds. Divided into two groups, one received reserpine, the other a placebo.

The drug produced better cooperation in all types of cases, replaced sedations, and served as a tranquilizer in emotional states. Reserpine was especially beneficial in allaying tension in tension athetosis and in reduction of tremor in tremor athetoids. The children who received reserpine were better able to cooperate in the physical therapy programs, often gaining more motivation

when fears were removed. No significant effects were recorded as a result of placebo medications.

Children receiving the drug showed no significant untoward effects. Drowsiness was occasionally noted but was felt to be a secondary effect due to the more general relaxed state of the patient.

Tendon Transplantation in the Prevention of Foot Deformities after Poliomyelitis in Children

J. Mortens, and M. F. Pilcher. Institute of Orthopaedics, Royal National Hospital, London. J. BONE & JOINT SURG., 38-B: 633-639, August 1956

The principles of tendon transplantation have been laid down by many authorities; this study has served to underline the importance of some of them.

Operation should not be undertaken until at least a year after the onset of the disease. This rule was broken on three occasions reported in this series; in two cases the result was inconclusive because of further recovery of muscle power.

It is preferable to delay operation until the age of five years: first, because accurate muscle charting may be difficult in a young child; and secondly, because overcorrection and secondary deformities occur more readily. On the other hand the primary deformity may progress more rapidly in the young child, making earlier operation sometimes justifiable.

Accurate muscle charting is essential. An apparently paralyzed muscle may recover considerable power after correction of fixed deformity; similarly a transplantation to assist the weak muscle may result in its gaining power. For this reason a period of physical therapy should follow correction of a fixed deformity before transplantation is planned.

Structural deformity must be corrected so far as possible before transplantation is carried out. This applies particularly to a tight tendo calcaneus. When the limb is short or the quadriceps weak, some degree of fixed equinus may be desirable; but if it is decided not to correct the equinus, too much must not be expected of a transplant to restore side-to-side balance.

The hazards of operation are overcorrection, instability, and secondary deformity. In designing an operation, the foot as a whole should be considered in relation to the three systems of balance, lest in restoring balance in one system it is destroyed in another. In cases of extensive paralysis it is impossible to achieve both balance and stability by tendon transplantation alone.

When weakness is not severe the following procedures are fairly well established: 1) transplantation of tibialis anterior towards the outer border of the dorsum of the foot for equinovarus deformity from weakness of the peronei; 2) transplantation of extensor hallucis longus to the first metatarsal, preferably with interphalangeal arthrodesis, for "medial cavus" from isolated weakness of tibialis anterior. 3) Planovalgus deformities may be treated by transplantation of the peronei to the dorsum of the foot, but the results are less reliable. It is possible that in some cases further progression of the deformity is prevented, but in the more severe deformities tendon transplantation alone is inadequate. 4) The results of calf reinforcement are even less predictable; they range from complete failure, through satisfactory results, to equino-valgus from overcorrection, or gross instability. If there is a calcaneocavus deformity with side-to-side balance, tendon transplantation is of doubtful value. On the other hand, in some cases of calcaneocavovarus or valgus the muscles causing the varus or valgus may profitably be transplanted to the tendo calcaneus even at the risk of producing an equinus deformity.

The results presented in this paper are mostly early. In analyzing them the authors considered mainly the deformity of the foot; strict standards of assessment were adopted, and the pitfalls of tendon transplantation were emphasized.

Some of the operations giving poor results as regards deformity nevertheless improved function. The method as a whole has a place in the treatment of the partly paralyzed foot in the child.

Intermittent Positive Pressure Breathing: An Adjunct in the Rehabilitation of Thoracic Surgery Patients

Marilyn J. Anderson and Elmore M. Aronstam, Valley Forge Army Hospital, Phoenixville, Pa., DIS. CHEST, 30: 168-171, August 1956

At Valley Forge Army Hospital the postoperative thoracic surgery patients receive an intensive program of physical therapy. This program includes localized pressure expansion and diaphragmatic breathing, shoulder exercises, and postural correction. One of the problems in this treatment has been the fact that underwater seal drainage tubes and the operative incision cause pain and spasm to such a degree that the patient is reluctant to use the operated side of the chest. It was felt that intermittent positive pressure breathing might be of value in overcoming the mental barrier to ventilation induced by postoperative pain.

A preliminary study was set up using 30 routine patients undergoing resectional pulmonary surgery. The first 15 patients were treated with shoulder exercises, postural correction, and pressure-expansion breathing exercises for the first two postoperative weeks. The second group received the same exercise regime, but in addition was given intermittent positive pressure breathing at 5 to 20 centimeters of water concomitantly with pressure-expansion breathing for the same postoperative period. Vital capacities were recorded routinely. The results of this study show a progressive, more rapid approach to the preoperative vital capacity value for the group of patients treated with intermittent positive pressure breathing. In no case was this treatment found to be intolerable to the patient or to cause leaks following segmental resection.

Original Papers For Conference

Now is the time to start thinking of the paper you are going to present at the 1957 American Physical Therapy Conference to be held in Detroit. A special session is being set aside by the Program Committee for your paper.

More about this in the next issue of the *Review*. In the meantime contact Marcia Shaw, Program Chairman, 28721 Jefferson, St. Clair Shores, Michigan, and give her an idea of the title of your paper.

Book Reviews . . . . .

Das Klapp'sche Kriechverfahren (Klapp's Creeping Exercises). *By Dr. Bernhard Klapp, in collaboration with Ella Biederbeck and Ingeborg Hess. Cloth; price RM 11.70. Pp. 70; illus. Georg Thieme Verlag, Stuttgart 1952.*

One nice summer afternoon in 1926 a policeman on duty in a residential section of Potsdam, Germany, hardly believed his eyes when he saw a group of youngsters clad in bathing suits, creeping on hands and knees along the sidewalk. He just shook his head when told that this was the daily outing of the "Klapp Kids," patients from a nearby orthopedic institution who were not allowed to assume the upright position.

At this time, however, Dr. Klapp's method for the correction of spinal curvatures, first outlined in 1910, had already gained wide recognition in professional circles throughout Europe. World War II put a temporary stop to most treatment and teaching programs, but since 1944 there has been a revival of interest in this "school" of treatment for scoliosis and other deformities of the spine.

This book, first published a few years after Dr. Klapp's death in 1949, presents, in German language, primarily a description of the creeping exercises. There is little emphasis on discussion of etiological and anatomical factors as they relate to the prevention or correction of scoliosis. The basis for this system is the belief that without the upright position there is no scoliosis since it has never been observed in four-legged animals. Lateral curvature of the spine is thought to be due to orthogenetic degenerative factors connected with the upright position, particularly during periods of rapid growth. Therefore, almost all Klapp's exercises are done from horizontal positions such as on one's hands and knees, kneeling, creeping, and crawling. The sequence and direction of trunk, arm, and leg movements are modified to correct single, double and C curves, kyphosis, and lordosis. Strengthening exercises for the back extensors are stressed.

The book is richly and well illustrated and will give the reader, possibly even without knowledge of German, some idea of the system without having observed it in practice. It should also be pointed out that many of the exercises could easily be modified to be done stationary if circumstances should not allow for locomotion.

On the debit side, it could be said that not enough space is given to discussions of other aspects closely related to the understanding of defects of the spine, such as: general posture, the role of abdominal exercises, breathing exercises, corsets or other supportive apparatus, and positioning. The still controversial issue of compensation is not even mentioned. The question of imbalance of musculature in the extremities is barely touched, nor are exercises suggested which might possibly correct it.

Although Klapp's creeping exercises could hardly be used as an exclusive method in the treatment of scoliosis, they certainly should find wider recognition in a well-rounded program for the prevention and correction of this deformity.

A Manual of Fractures and Dislocations. *By Barbara Bartlett Stimson, M.D., Med.Sc., F.A.C.S., Director of Bone & Joint Surgery, St. Francis Hospital, Poughkeepsie, N. Y.; Formerly Assistant Professor of Surgery, Columbia Presbyterian Medical Center; and Attending Surgeon, Fracture Service, Presbyterian Hospital, New York, N. Y. Cloth; price $4.50. Pp. 224; illus. Lea & Febiger, Philadelphia, 1956*

This is a handbook on fractures written primarily for students and general practitioners. It is an excellent guide for the teaching of fractures. The principles involved in the occurrence of fractures and in their repair are discussed. Principles of technic are discussed and their application for most fractures is described.

The material is well arranged and divided into four parts. The first part is a general consideration and deals with bone repair in fractures, the symptom and signs of fractures, and the principles of treatment. The other three parts take up the individual fractures—dealing first with the upper extremities, next with the trunk, and then with the lower extremities.

All that is written is based on experience and takes into consideration the general opinion of other authors.

The language is clear and the descriptions are brief. The book is illustrated with line drawings which are adequate.

This book would help the physical therapist in understanding the rehabilitation of fracture cases.

Thoracic Surgery for Physiotherapists. *By Gladys M. Storey, S.R.N., F.C.S.P. In charge of Physiotherapy in Thoracic Unit, St. Thomas Hospital, England. Foreword by N. R. Barrett, M.Chir., F.R.C.S. Cloth; price $3.00 (U. S. only). Pp. 132; illus. J. B. Lippincott, Philadelphia 1956.*

The author is obviously well informed in problems of the thorax. In the preface she states that the aim of the book is to serve as a reference for students of physical therapy. The book is just that, dealing with such subjects as nomenclature, diagnostic procedures, and surgical intervention, and it covers, superficially, how physical therapy treats these thoracic problems. Miss Storey states that hospitals have different policies, not only in her own country, Great Britain, but elsewhere. In the United States for instance, the postsurgical aspects are accented, while the physical therapists from the Northern countries are particularly skilled in drainage of the lungs and in percussive technics applied to the chest wall in the presence of pleural effusion. They work closely with the patient in the recovery room following surgery, using coughing aids as well as vibratory technics to prevent or relieve atelectasis.

The material is divided into two parts. *Part one* is devoted to complications, diagnostic procedures, signs and symptoms valuable to the physical therapist and finally includes two surgical procedures. *Part two* lists conditions for which surgical treatment may be indicated. The arrangement is awkward since one would think all the opeartive procedures would be in this one section.

All in all it is an excellent handbook for physical therapy students in hospitals doing clinical practice with thoracic surgery. It is timely, for we see that thoracic surgery is growing. The skill is greater, the risks less—thus creating a larger number of candidates. It is essential that

physical medicine not be caught napping while these procedures continue to develop. Cardiac surgery, for example, has shown marked increase. A good program is necessary if the physical therapist is to serve the patient and the surgeon well.

Handbook of Physical Therapy. *By Robert Shestack, Technical Director, Department of Physical Therapy, Washington County Hospital, Hagerstown, Maryland; Director, Department of Physical Therapy and Consulting Physical Therapist, Kings Daughters Hospital, Martinsburg, West Virginia. Foreword by William Nachlas, M.D. Cloth; price $4.25. Pp. 212; illus. Springer Publishing Company, New York, 1956.*

This book is based on observations made by the author during fourteen years of physical therapy experience. The purposes as stated in the preface are:

1. To help the general practitioner who is too busy to study every phase of physical therapy
2. For the physical therapist to use as quick reference on potentialities and various modalities employed by him
3. For broader orientation of the student of physical therapy
4. For nurses in hospitals, clinics, and physicians' offices who assist in the administration of physical therapy

Intended as a manual, the book is divided into two main sections: first, a section on modalities gives the reader an idea of the resources of the field; second, there is a survey of pathological conditions in which physical therapy has proved beneficial.

Whatever the author's aims, in the opinion of this reviewer, he has failed to accomplish them either through effectiveness of presentation or in content of material.

The style of writing is ambiguous making it very difficult to follow explanations. The discussions are often vague and confusing. In many spots the organization is poor. The terminology is sometimes erroneous such as use of "stomach" muscles for abdominals. A dogmatic style of presentation with much usage of the words "should" and "must" in suggestion of treatment is objectionable.

The accuracy of the author's statements is highly questionable in many instances. Material presented is often completely inadequate or *confused*. Dubious principles and technics of exercise are described, and there is no clear distinction between stretching and exercise. Forced bending for elbows is suggested without explanation. In discussing the use of diathermy for chronic arthritis, there is no clear idea regarding the different types of arthritis. The statements, "Moist heat or very mild infrared radiation *should* be applied for about 30 minutes two or three times daily, for acutely or subacutely inflamed joints," or "In subacute and chronic stages, physical therapy *must* be administered at least once daily, and preferably more often," are examples of both the dogmatic style and questionable accuracy. The chapter on poliomyelitis is totally inadequate, consisting largely of description of spasm in various parts of the body with very short paragraphs on muscle testing and activities of daily living.

It is regrettable that a book such as this is presented. By all standards, physical therapy must be prescribed for the individual patient but here arbitrary lists of treatment are given with no apparent regard for individual factors or other existing conditions. Much of the book is description of treatment which should be prescribed only by the physician but here it is completely outlined. A book of this type in inexperienced hands might prove quite disastrous since such persons might not be able to discern contraindications to the stated treatment. Neither would it be of value to experienced therapists because of the superficial type of presentation and doubtful accuracy of material. There is nothing found in this manual which is not discussed more thoroughly and accurately in other literature.

Skoliosen-und Diskopathien-Behandlung. *By Erna Becker. Cloth; price RM 2.80. Pp. 36; illus. Gustav Fischer Verlag, Stuttgart 1953.*

While most present methods for the treatment of scoliosis, including Klapp's creeping exercises, stress the importance of lateral trunk flexion and of exercises involving the erectors of the spine, the system based on Dr. Niederhoffer's work stems from the belief that scoliosis is rarely caused by weakness in that muscle group. If unilateral weakness of the erector spinae is present, the author believes it would be coupled with weakness of other muscles innervated through the same segment of the spinal cord (such as serrati, obliquii, and transverse abdomini); which rarely occurs.

The author states that the basis of every scoliosis is imbalance of muscle strength between both sides of the body; hardly ever in the long musculature of the back (erector spinae) but rather in the broad musculature (trapezius, latissimus dorsi, rhomboids, quadratus lumborum and psoas major). These muscles are stronger on the convex side of the curve and overbalance the weakened muscles on the concave side. This results not only in lateral curvature of the segment involved but also in displacement of the trunk to the convex side and in torsion of the vertebral bodies above and below the curve. The erector spinae group on the convex side, called upon to prevent the trunk from falling over to the concave side, becomes hypertrophied while the muscles on the opposite side become atrophied by disuse.

An interesting discussion of the anatomy of the spinal column and the dynamic forces of the muscles involved offers material to support this theory. Most of the ideas presented follow the widely accepted analysis of muscle function, except that the role of the quadratus lumborum and psoas major in the etiology of scoliosis is not clearly enough outlined. One also misses a reference to imbalance of other muscles related to curvature of the spine, such as the abductors and adductors of the hip and the abdominals.

The exercises for the correction of scoliosis are well explained in text and pictures. They are few in number and primarily aimed at increasing muscle strength and control of the weakened broad muscles of the trunk through well localized isometric movements against resistance.

In her introduction, the author acknowledges that this book originated from a series of her lectures and that it is, therefore, limited to a presentation of the essentials of this particular form of treatment. Thus, we cannot rightly expect to find other aspects such as mobilization of the rigid spine and the importance of correction of muscle contractures included in this volume. It must be considered an addition to the information that can be found in other textbooks.

It may possibly be said, that in spite of (or perhaps because of) the

many good references now available on the subject of scoliosis, there still seems to be a need for *one* book on this subject which would present various methods of treatment and thus help the physician and physical therapist to make an intelligent choice in their treatment program according to the need of the individual patient.

The reviews here published have been prepared by competent authorities and do not represent the opinions of the American Physical Therapy Association.

Our Book Reviewers for December

Mrs. Frances Alterman, formerly Chief, Physical Therapy, Veterans Administration Hospital, Oteen, North Carolina.

Emil D. W. Hauser, M.D., Associate Professor, Orthopedic Surgery, Northwestern University, Chicago.

Mary C. Singleton, Coordinator of Therapy, Department of Physical Medicine, Georgia Warm Springs Foundation, Warm Springs, Georgia.

Elizabeth Zausmer, Assistant Technical Director of Physical Therapy, Children's Medical Center, Boston; Instructor, Simmons College, Boston.

Second World Rehabilitation Film Awards

(continued from page 825)

receive a Plaque of Honor and Certificates of Merit will be awarded to other outstanding films. In announcing these awards, Dr. Howard A. Rusk, President of the International Society, indicated that the selection of winning films will be made by an international panel of rehabilitation experts on the basis of technical accuracy, clarity of presentation and world-wide adaptability. To be eligible, a film must have been released after August 1, 1954, in 16 mm. form and be available for showing in London not later than May 15, 1957. Nomination forms and further details may be obtained from the International Film Library, International Society for the Welfare of Cripples, 701 First Avenue, New York 17, N. Y.

Christmas Party Volunteers May Be Interested in Physical Therapy

Many hospitals and crippled children's centers conduct Christmas parties for children who are hospitalized during the holiday season. These are occasions on which you can build up interest in physical therapy by inviting as volunteer helpers those high school and college students who have expressed an interest in physical therapy. This gives them a little first-hand experience in working with handicapped people and may help them decide whether or not they really want to go into physical therapy as a career.

You can set up productive

PHYSICAL THERAPY RECRUITMENT TIE-INS

with your community's campaigns

Arthritis and Rheumatism Foundation — **Continued into December**
National Foundation for Infantile Paralysis—"March of Dimes" — **January**

Use this check list to make sure that you are taking advantage of every opportunity to tie-in your recruitment program with your local drives. These suggestions are good possibilities for easily and effectively publicizing the career opportunities in physical therapy through the cooperation of the campaign chairmen in your community.

Window displays—Show your posters and literature with campaign material in stores (department stores, specialty shops, drug stores, hospital supply companies); community health and welfare agencies; and youth-service organizations.

Exhibits—Set up bulletin board- and table-exhibits in schools; libraries (public and school); adult education centers; health centers; hospitals and clinics; conventions; civic and government agencies; YMCA, YWCA, YMHA, YWHA; Girl Scouts, 4-H, etc. clubrooms; men's fraternal and civic clubs; women's clubs (lounges, libraries, and lobbies); PTA meeting rooms; church recreational centers; and railway, bus and airline terminals.

Distribution of literature—Have your recruitment brochures distributed with the local campaign materials (mailings and handouts at meetings).

Newspaper publicity—daily and weekly, including county newspapers.

Local Advertising—plugs in retail ads (space donated by advertisers), or your own recruitment ads sponsored and paid for by a local group of civic leaders.

Be alert for publicity tie-ins every day—wherever you are. The possibilities for getting recruitment help through tie-ins with your community's March of Dimes and your community's health agencies' drives are unlimited.

What's New . . . . .

190. Tilt Bed

Franklin Tilt Bed conforms to standard hospital bed sizes. The manufacturer states that the bed provides for all of the standard hospital bed adjustments as well as having the important features of a tilt table. A remote control switch which controls the motorized tilting mechanisms may be operated from any position near the bed. Franklin Hospital Equipment Co.

191. Communication Method for Aphasics

Silent Spokesman is a 35 page communication device for the aphasic patient. Numerous illustrations permit the patient to indicate his personal needs, wishes regarding food, items of clothing, general requests, general questions, indications of pain or other symptoms, charts of words of measure, words of degree, key numbers, time chart, the alphabet, and miscellaneous items. Hospital Topics.

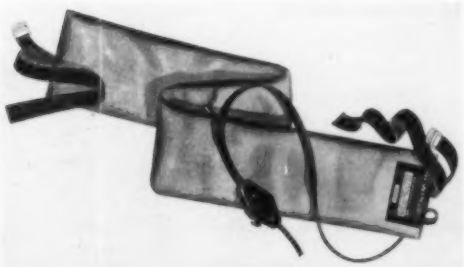
For more information on items write to The Physical Therapy Review, 1790 Broadway, New York 19, N. Y.

New items which may be of interest to physical therapists will be mentioned in these pages each month. The accompanying explanations are made by the manufacturers and have not been investigated by the *Physical Therapy Review*.

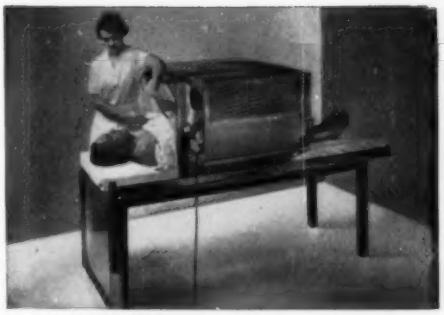
192. Motorized Wheel Chair

Chair Boy, according to the manufacturer, is the only completely self-controlled motorized drive which can be attached to most outdoor type tubular wheel chairs (8″ front casters). A single adjustable arm control provides two forward speeds, one reverse speed, steering, and smooth braking. The arm control may be mounted for right- or left-hand operation. At medium speed the Chair Boy will easily ascend a 10 degree ramp. Constructed of heavy gauge steel and protected at the rear by an aluminum bumper, Chair Boy is powered by 2 standard 6 volt automotive batteries, available locally, which will propel the Chair Boy 10-20 miles between changes. Lumex, Inc.

193. Heated Bandage



Winco Heating Bandage, according to the manufacturer, provides 162 square inches of heating surface, has a 3 position switch, dual thermostats to prevent overheating and is approved by Underwriters' Laboratories. The bandage is easily adjusted with tie strings and buckles so that it may be applied to arms, legs, shoulders, or any other area of the body. A washable cover and a storage canister are provided. Winco Affiliates, Inc.



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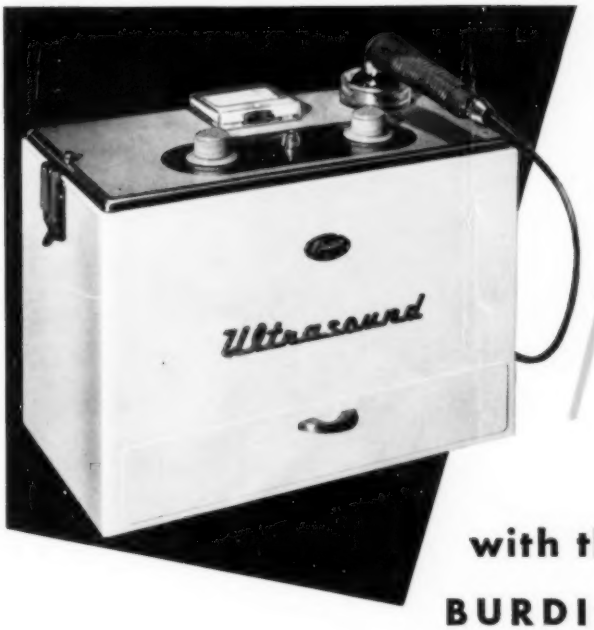

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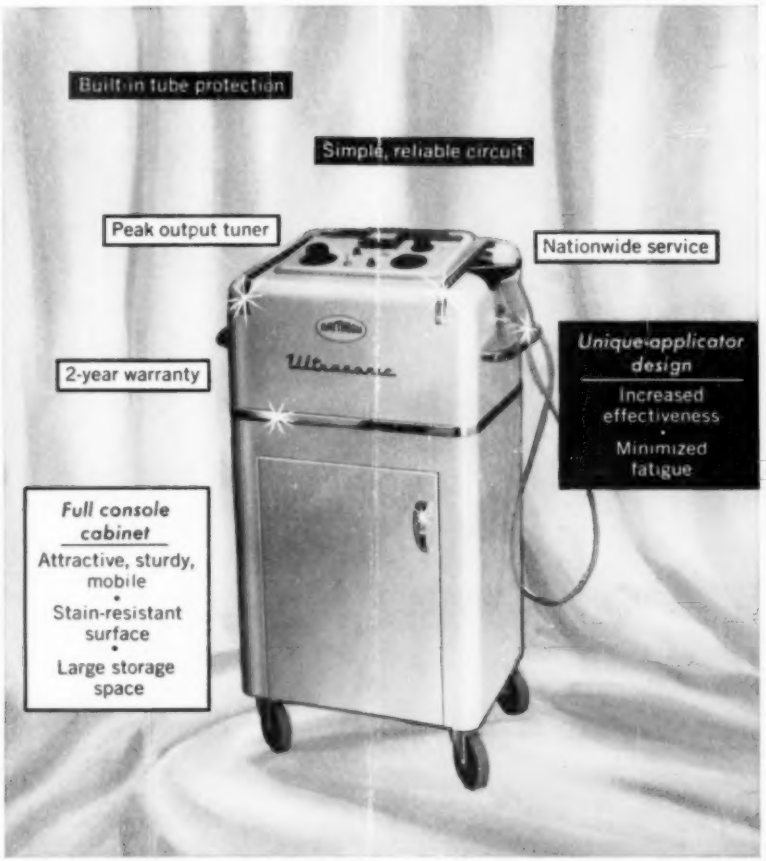

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